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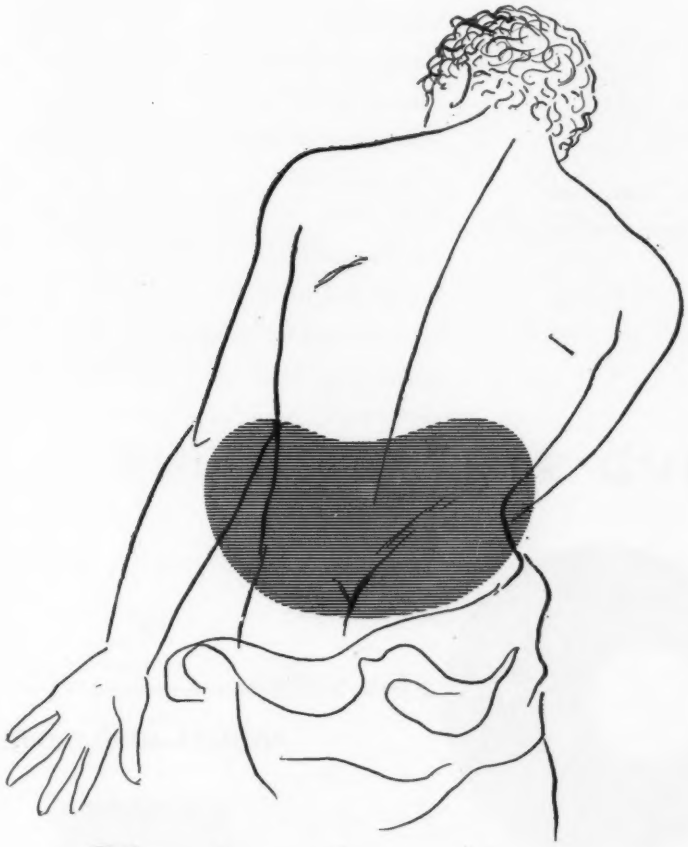

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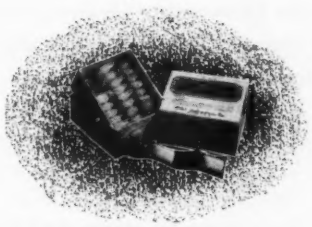

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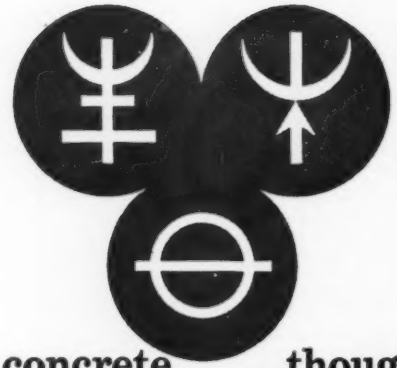

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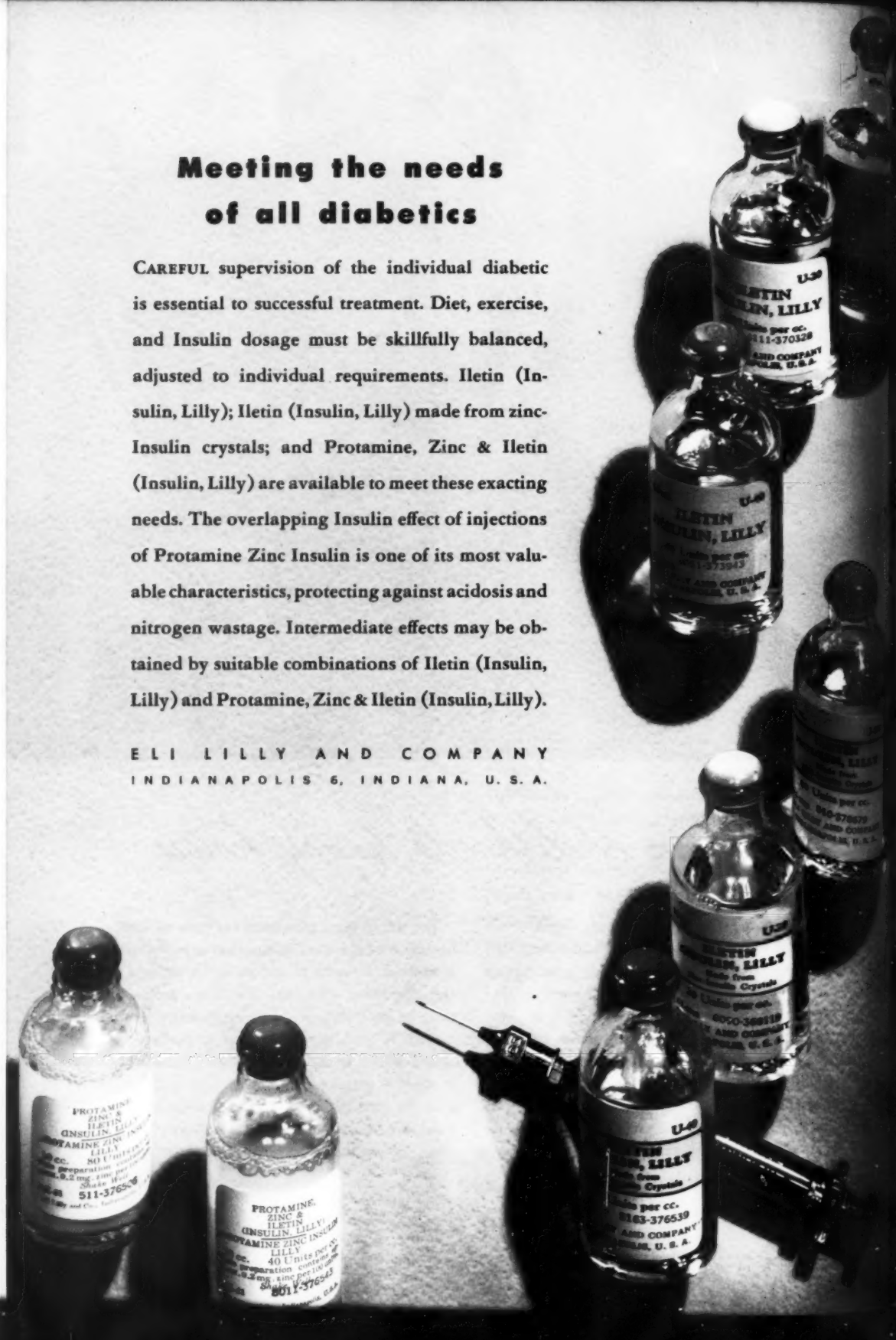

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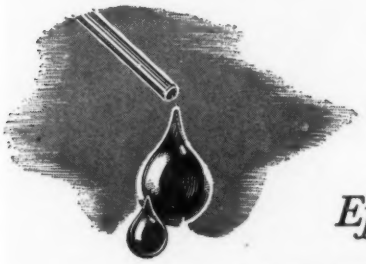

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Neo-Synephrine Sulfathiazolate

For Decongestion and Bacteriostasis

THERAPEUTIC APPRAISAL: Prompt, prolonged decongestion of nasal mucosa; ample bacteriostatic action without excess sulfathiazole; sustained effectivness even on repeated use; isotonic, non-irritating, and virtually harmless to cilia; essentially free from side effects such as cardiac disturbances, wakefulness, and other stimulation of the central nervous system.

INDICATED for decongestive effects and possible bacteriostatic influence in combating secondary invaders accompanying common colds and sinusitis.

ADMINISTRATION may be by dropper, spray or tampon, with dosage determined by individual needs. Patients should be cautioned to use only as directed.

SUPPLIED in 0.6% solution, bottles of 1 fl. oz. and 1 pint.

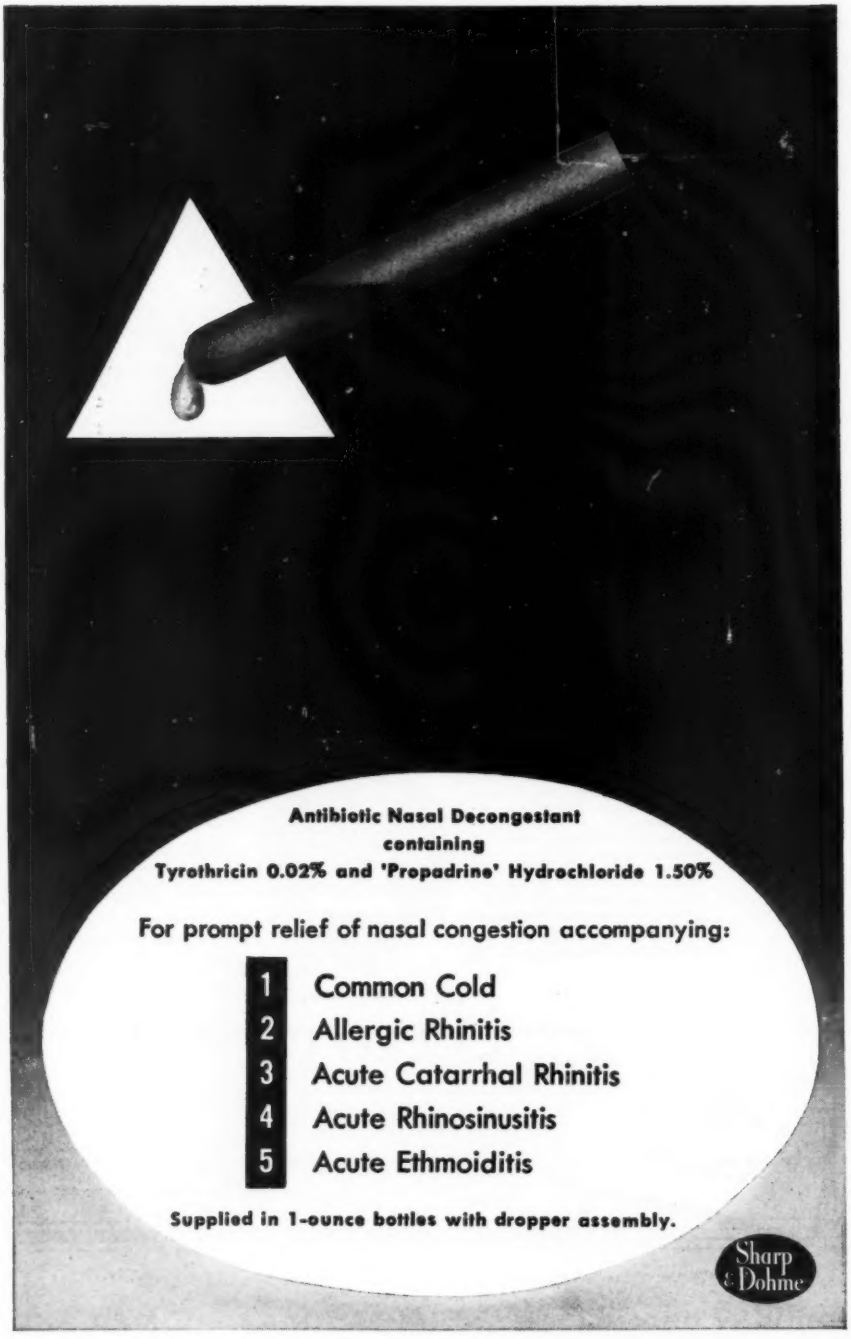
Samples on Request.

Frederick Stearns & Company
Division

DETROIT 31, MICHIGAN

NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark *Neo-Synephrine Sulfathiazolate* Reg. U. S. Pat. Off.


Antibiotic Nasal Decongestant
containing
Tyrothricin 0.02% and 'Propadrine' Hydrochloride 1.50%
For prompt relief of nasal congestion accompanying:
1 Common Cold
2 Allergic Rhinitis
3 Acute Catarrhal Rhinitis
4 Acute Rhinosinusitis
5 Acute Ethmoiditis
Supplied in 1-ounce bottles with dropper assembly.
Sharp & Dohme

no bribe, no wheedle, no threat

The many youngsters who require the appetite-stimulating impetus of the vitamin B complex will take 'Ryzamin-B' No. 2 without bribe, threat, or coaxing. They love—and ask for—this flavorsome, honey-like preparation—as a spread with jam or peanut butter, dissolved in milk, fruit juice or other beverage, or directly from its special measuring spoon. 'Ryzamin-B' No. 2 caters to the finicky palate of young and old.

'Ryzamin-B' No. 2 is a concentrate of oryza sativa (American rice) polishings. Its rich natural vitamin B is enhanced with pure crystalline B factors.

Only three grams daily provide: Vitamin B_1 (Thiamine Hydrochloride) 3 mgm. (1,000 U.S.P. Units); Vitamin B_2 (Riboflavin) 2 mgm.; Nicotinamide 20 mgm. and other factors of the B complex. Gram measuring spoon with each packing... Tubes of 2 oz. and bottles of 8 oz.

'Ryzamin-B' BRAND
RICE POLISHINGS CONCENTRATE
No. 2
WITH ADDED THIAMINE HYDROCHLORIDE, RIBOFLAVIN AND NICOTINAMIDE

'Ryzamin-B' registered trademark.

BURROUGHS WELLCOME & CO. (U.S.A.) INC.
9 & 11 EAST 41ST ST.
NEW YORK 17

New and unusually effective

White's **OTOMIDE**

for topical chemotherapy in acute and chronic ear infections

The unique clinical advantages of this stable, non-irritating solution of sulfanilamide, urea and chlorobutanol may be briefly summarized as follows:

POTENTIATED ANTIBACTERIAL ACTIVITY—urea-sulfanilamide mixture more effective than either drug used independently.[1] Not inhibited by pus and tissue debris.

BETTER TISSUE DIFFUSION—urea-sulfanilamide mixture diffuses more actively through living and dead tissues.[2]

TOLERANCE—freedom from alkalinity virtually obviates local chemical irritation.

ANALGESIA—effective chlorobutanol analgesia without impaired sulfonamide activity.

WIDE FIELD—effective in BOTH acute AND chronic otologic infections. Active against certain sulfonamide-resistant bacteria.[3]

FORMULA:

Sulfanilamide	5%
Carbamide (Urea)	10%
Chlorobutanol	3%
Glycerin (high sp. gr.)	q.s.

1. Tsuchiya, H. M. et al: Proc. Soc. Exp. Biol. and Med., *50*:262, 1942.
2. McClintock, L. A. and Goodale, R. H.: U. S. Naval Med. Bull., *41*:1057, 1943.
3. Strakosch, E. A. and Clark, W. G.: Minn. Med., *26*:276, 1943. Brown, C. et al: Am. J. Surg., to be published.

Available in dropper bottles of one-half fluid ounce (15 cc.)—on prescription only.

WHITE LABORATORIES, INC. PHARMACEUTICAL MANUFACTURERS, NEWARK 7, N. J.

ESKADIAZINE

makes oral sulfadiazine therapy easier

ESKADIAZINE—the ideal oral sulfadiazine—has these three advantages:—

1 **Fluid Form.** This new fluid sulfadiazine is the ideal oral dosage form, especially for infants and children, and also for the many adults who object to tablet medication. Each 5 cc. (1 teaspoonful) contains 0.5 Gm. (7.7 gr.) of sulfadiazine.

2 **Exceptional Palatability.** Eskadiazine is so surprisingly palatable and pleasant in consistency that it is accepted willingly by all types of patients. Children actually like to take it.

3 **More Rapid Absorption.** The findings of a recent clinical study by Flippin and associates (Am. J. M. Sc., Aug. 1945) indicate that with Eskadiazine desired serum levels may be far more rapidly attained than with sulfadiazine administered in tablet form.

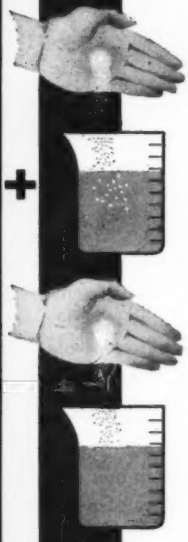
Smith, Kline & French Laboratories, Philadelphia, Pa.

S.K.F.'s new, outstandingly palatable fluid sulfadiazine for oral use

INTRODUCING

Combisul - TD

(equal parts of sulfathiazole and sulfadiazine) in one tablet



TO REDUCE RENAL TOXICITY INCIDENT TO SULFONAMIDE THERAPY

Recent experimental and clinical studies[1,2] prove that administration of sulfathiazole and sulfadiazine in combination in equal parts reduces renal complications such as crystalluria, hematuria and urinary tract blockage, and is much safer than either drug used alone in whole dosage. Simultaneously, antibacterial activity and therapeutic efficacy are maintained.

COMBISUL-TD presents 0.25 gram sulfathiazole and 0.25 gram sulfadiazine—a total of 0.5 gram per tablet. No signs of renal toxicity have been encountered by use of this mixture and even crystalluria is infrequent. The indications for, and dosage of, COMBISUL-TD are the same as for either drug administered alone. Meningitis is an exception, for which COMBISUL-DM, a combination of 0.25 gram sulfadiazine and 0.25 gram sulfamerazine is available.

COMBISUL-TD available in 0.5 gram tablets. Bottles of 100 and 1000.
COMBISUL-DM available in 0.5 gram tablets. Bottles of 100 and 1000.

1. Lehr, D.: Proc. Soc. Exper. Biol. & Med. *58*:11, 1945.
2. Lehr, D.: In press.

Trade-Marks COMBISUL-TD and COMBISUL-DM — Reg. U. S. Pat. Off.

Schering CORPORATION · BLOOMFIELD, N.J.
IN CANADA, SCHERING CORPORATION LIMITED, MONTREAL

ERYTHROL TETRANITRATE MERCK in Angina Pectoris

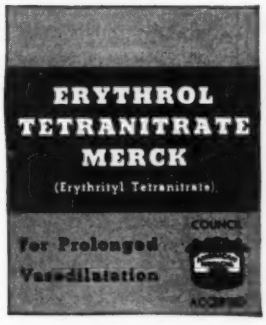
It is generally agreed that the acute attack of anginal pain is most readily relieved by the prompt removal of the provocative factor, and by the use of nitrites. For this purpose, the rapidly acting nitrous and nitric acid esters, amyl nitrite and nitroglycerin, are considered most useful.

For prophylactic purposes—to control anticipated paroxysms—the *delayed but prolonged action* of erythrol tetranitrate is more effective. Erythrol tetranitrate, because of its slower *and more prolonged action*, is also considered preferable for the purpose of preventing nocturnal attacks.

The vasodilatation produced by Erythrol Tetranitrate Merck begins 15 to 20 minutes after administration, and lasts from 3 to 4 hours.

The properly timed administration of a vasodilator having a sustained effect may prevent the following episodes of angina pectoris:

- **The man who finds it necessary to stop and rest when he walks to the train in the morning.**
- **The man who suffers "indigestion" and "gas" on exertion, or after a heavy meal.**
- **The man who has pain in his chest and arms, and weakness upon any anxiety, anger, or nervous strain.**



MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

When the Fetus Steals Maternal Iron

To guard against hypochromic anemia during pregnancy, Fergon is particularly valuable because it is exceptionally well tolerated. Fergon is virtually non-irritating therefore rarely associated with gastro-intestinal distress.

Fergon

Ferrous Gluconate Stearns

FOR HYPOCHROMIC ANEMIAS

COMPOSITION: Fergon is *improved* ferrous gluconate. Prepared and stabilized by Stearns' special process, it contains no more than 0.2% ferric iron.

THERAPEUTIC APPRAISAL: Fergon, being only slightly ionized, is virtually non-astringent, non-irritating; thus it may, and should, be administered before meals to facilitate maximum absorption . . . Readily soluble and available for absorption throughout the entire pH range of the gastro-intestinal tract . . . Published data show that ferrous gluconate is more efficiently utilized than other iron salts.*

INDICATED in the treatment and prevention of anemias due to iron deficiency; especially valuable in patients who do not tolerate other forms of iron.

DOSAGE: Average dose for adults is 3 to 6 tablets (5 gr.) or 4 to 8 teaspoonfuls of elixir daily; for children, 1 to 4 tablets (2½ gr.) or 1 to 4 teaspoonfuls elixir daily.

SUPPLIED as 5% elixir, bottles of 6 and 16 fl. oz.; 2½ gr. tablets, bottles of 100; 5 gr. tablets, bottles of 100, 500 and 1000.

*Ramihoff, P., & Goebel, W. F.: J. Clin. Investigation, 16:547; 1937

Frederick Stearns & Company
Division

DETROIT 31, MICHIGAN

NEW YORK KANSAS CITY SAN FRANCISCO WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

Trade-Mark Fergon Reg. U. S. Pat. Off.

Let these be years of Grace

THERAPY with natural estrogens provides a feeling of well-being not attained with synthetic preparations. The years of middle life can be graceful years when menopausal symptoms are controlled with CONESTRON (natural conjugated estrogens).

Each tablet contains 0.625 mg. conjugated estrogens (equine) expressed as sodium estrone sulfate.

Bottles of 100 and 1000

TABLETS

CONESTRON

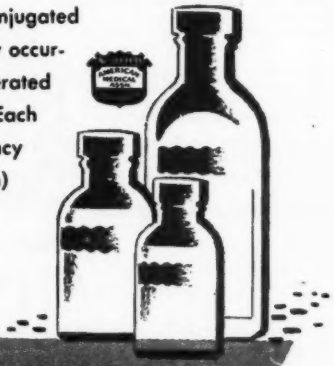
(TRADE-MARK)

Wyeth

WYETH INCORPORATED • PHILADELPHIA 3 • PA.

- To permit greater flexibility of dosage.
- To provide a graduated estrogenic intake where required.
- To accommodate those patients who are partial to liquid medication.
- "*Premarin*" Liquid . . . conjugated estrogens (equine) . . . naturally occurring . . . orally active . . . well tolerated . . . imparts a feeling of well-being. Each teaspoonful is the equivalent in potency of one "Premarin" Tablet (Half-Strength) No. 867.

Available in bottles of 120 cc. (4 fluid oz.), No. 869



"*Premarin*" NOW IN LIQUID AND TABLET FORM

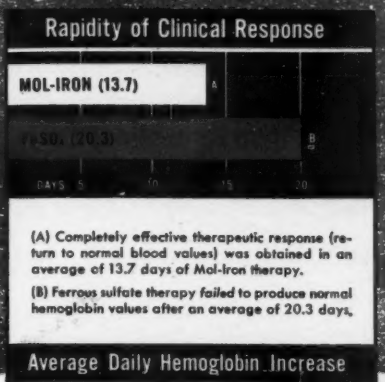
Reg. U. S. Pat. Off.

CONJUGATED ESTROGENS (equine)

Ayerst

AYERST, McKENNA & HARRISON LIMITED, 22 East 40th Street, New York 16, N. Y.

A NEW AND DEFINITE ADVANCE IN TREATING IRON-DEFICIENCY ANEMIAS

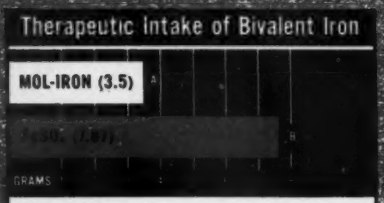


(A) Completely effective therapeutic response (return to normal blood values) was obtained in an average of 13.7 days of Mol-Iron therapy.

(B) Ferrous sulfate therapy *failed* to produce normal hemoglobin values after an average of 20.3 days.

(A) The group treated with Mol-Iron averaged a daily hemoglobin increase of 2.48 per cent (0.36 Gm. per cent).

(B) The group treated with ferrous sulfate showed an average daily gain of hemoglobin of 0.83 per cent (0.12 Gm. per cent)—a response about one-third as effective.



(A) The Mol-Iron treated group received an average total of 3.528 Gms. of bivalent iron to produce the sought for result (return to normal blood values).

(B) While an average ingestion of 7.871 Gms. of bivalent iron failed to achieve an optimal response in the ferrous sulfate treated group.

The charts summarize the results of a controlled study of comparative therapeutic response in post-hemorrhagic and nutritional hypochromic anemias. The series includes 49 cases treated with Mol-Iron and 21 with exsiccated ferrous sulfate; the results are typical of those observed in treatment of iron-deficiency anemias with White's Mol-Iron.

White's MOL-IRON TABLETS

Available clinical evidence indicates that, in hypochromic anemia, the therapeutic response to this highly effective synergistic combination—as compared with equivalent dosage of ferrous sulfate alone—has unusual advantages:

1. NORMAL HEMOGLOBIN VALUES ARE RESTORED MORE RAPIDLY, INCREASES IN THE RATE OF HEMOGLOBIN FORMATION BEING AS GREAT AS 100% OR MORE IN PATIENTS STUDIED.
2. IRON UTILIZATION IS SIMILARLY MORE COMPLETE.
3. GASTRO-INTESTINAL TOLERANCE IS NOTABLY SATISFACTORY—even among patients who have previously shown marked gastro-intestinal reactions following oral administration of other iron preparations.

INDICATED IN:

Hypochromic (iron-deficiency) anemias caused by inadequate dietary intake or impaired intestinal absorption of iron; excessive utilization of iron, as in pregnancy and lactation; chronic hemorrhage.

DOSAGE: One or two tablets three times daily after meals.

Available in bottles of 100 and 1000 tablets.

Ethically promoted—not advertised to the laity.

WHITE LABORATORIES, INC.,
Pharmaceutical Manufacturers,
NEWARK 7, N. J.

Assurance of adequate day-by-day calcium reinforcement is made convenient and pleasant when prescribed in the form of—

calcium gluconate effervescent

FLINT

The palatability factor of Calcium Gluconate Effervescent (Flint) is exceptionally important in calcium administration. There is no chalky, unpleasant after-taste.

Thus, the aging adult, whose diet has been low in calcium over a period of years, the pregnant woman and the lactating mother, will find this sparkling, effervescent form of calcium pleasant to take over a prolonged period.

Council-Accepted—protected by U. S. Patent No. 1983954. Each gram of Calcium Gluconate Effervescent (Flint) contains calcium gluconate U.S.P. 0.5 Gm., citric acid 0.25 Gm., and sodium bicarbonate 0.25 Gm.

The average dose is 1 to 1½ teaspoonfuls. It contains 48 to 52% calcium gluconate. In water it forms a clear, effervescent solution.

FLINT, EATON & COMPANY
DECATUR : ILLINOIS

in painful spasm . . .

Pavatrine with Phenobarbital provides both *neurotropic* and *musculotropic* spasmolysis—notably free from undesirable side effects—combined with mild central nervous sedation. Non-narcotic; orally administered.

INDICATIONS:

Gastrointestinal: cardiospasm, gastric hypermotility, pylorospasm, spasticity of duodenum, spastic states of colon

Dysmenorrhea: resulting from myometrial hypertonicity or excessive uterine contractions

Urinary Bladder: adjunctive therapy for relief of bladder spasm, whether due to a simple tenesmus, cystitis or mechanical trauma.

Pavatrine is the registered trademark of G. D. Searle & Co., Chicago 80, Illinois

PAVATRINE WITH PHENOBARBITAL
(β-diethylaminoethyl fluorene-9-carboxylate hydrochloride)

SEARLE *Research in the service of medicine*

Illustrated is the sulfathiazole-frosted pharynx of patient A.K., *two hours* after Paredrine-Sulfathiazole Suspension had been instilled intranasally.

WHY SUCH RAPID RELIEF

TO OBTAIN BEST RESULTS . . . the sore throat patient should not eat or drink fluids for one or two hours after instillation of Paredrine-Sulfathiazole Suspension. He should also make every effort to reduce nose-blowing and throat-clearing to a minimum.

Smith, Kline & French Laboratories, Philadelphia, Pa.

IN SORE THROAT ?

There are two important reasons why Paredrine-Sulfathiazole Suspension—when administered intranasally—is so successful in the treatment of acute nasopharyngitis:

1. Part of the Suspension remains beneath the middle and superior turbinates—and, mixing with sinus drip, retards the proliferation of bacteria before they reach the nasopharynx and intensify the infection.

2. Part of the Suspension drifts downward over the nasopharynx, forming a fine frosting on the nasopharyngeal mucosa. This thin blanket not only keeps producing a bacteriostatic solution at the site of infection, but also appears to provide marked surface analgesia.

PAREDRINE-SULFATHIAZOLE SUSPENSION

vasoconstriction in minutes

bacteriostasis for hours

NO MESS...
NO GREASE...
NO SCABIES

You remember how just hearing that a certain patient had scabies or pediculosis would make you itch even if you never went near him. And you remember only too well the ointment-smeared bedding that seemed the only way to get rid of the pesky skin parasites.

Now all this is obsolete. With 'Wellcome' Benzyl Benzoate Emulsion, the patient is merely painted with a clean, *non-greasy* emulsion, and when he bathes twenty-four hours later, the parasites are dead. Recurrence and dermatitis are infrequent.

'WELLCOME' BRAND

BENZYL BENZOATE

EMULSION 50%

Diluted with an equal volume of water before application. 2 or 3 fluid ounces of the 25% emulsion is usually sufficient for one treatment.

BOTTLES OF 4 FL. OZ.
BOTTLES OF ½ GALLON

Literature upon request

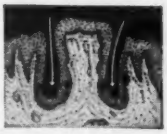
BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 EAST 41st ST., NEW YORK 17

in SORE THROAT

CĒPACOL
BRAND
ALKALINE GERMICIDAL SOLUTION

Cēpacol is rapidly effective against pathogenic bacteria associated with sore throat and, at the same time, acts as a mildly alkaline cleansing solution that allays irritation and soothes inflamed tissues.

PENETRATING—DETERGENT... Due to unusually low surface tension, recesses of the mucosa are reached by Cēpacol and cleansed by its foaming detergent action. In clinical use it is nontoxic, non-irritating, nonastringent, and does not interfere with healing.



PALATABLE... Cēpacol can be used as spray or gargle, full strength or diluted with an equal volume of water. Its delightful, refreshing flavor invites cooperation by the patient.

At prescription pharmacies in pints and gallons

Trademark "Cēpacol" Reg. U. S. Pat. Off.

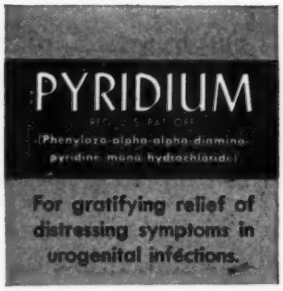
MERRELL

THE WM. S. MERRELL COMPANY, CINCINNATI, U. S. A.

. . . the characteristic response

THE prompt symptomatic relief provided by Pyridium is extremely gratifying to the patient suffering with distressing urinary symptoms such as painful, urgent, and frequent urination, tenesmus, and irritation of the urogenital mucosa.

Pyridium is convenient to administer, and may be used with complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis. *The average oral dose is 2 tablets t.i.d.*


PYRIDIUM
(Phenylazo-alpha-alpha-diamino-pyridine mono hydrochloride)
For gratifying relief of distressing symptoms in urogenital infections.

Pyridium is the United States Registered Trade-Mark of the Product Manufactured by the Pyridium Corporation.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

Clinical evidence indicates that the dry, rasping, tracheal cough, which frequently persists following influenza and pneumonia, responds promptly and favorably to a recently developed systemic and symptomatic approach employing—

Each fluidounce Elixir Bracodin represents:

Tincture Quebracho.....240 minims
Potassium Iodide.....22½ grains
Ephedrine Hydrochloride....¼ grain

Investigations reveal that the group of alkaloids obtained from the bark of *Aspidosperma Quebracho blanco* stimulate the respiratory center without marked action upon the heart.[1] This valuable pharmacologic effect is further enhanced by the systemic action of potassium iodide in liquefying the secretions. Tuft and Levin[2] have recently demonstrated the excretion of the iodides in the bronchial secretion after oral administration. Also, by the influence of ephedrine in relaxing the bronchi and permitting free breathing, Bracodin has proven of special value in the treatment of:

Bronchial asthma
Chronic or capillary bronchitis
Chronic irritations of the respiratory tract

Bracodin is well tolerated. The Elixir may be given in water, fruit juices, combined with the standard vehicles, or with codeine or paregoric. Supplied in bottles of one pint and one gallon. Literature is available on request.

1. Solis-Cohen, S. and Githens, T. S.: Pharmacotherapeutics, ed. 1, New York, D. Appleton and Company, 1928, p. 1375.
2. Tuft, L. and Levin, N. M.: Studies of the Expectorant Action of the Iodides, Am. J. M. Sc. 203:717 (May) 1942.

McNeil Laboratories
INCORPORATED
PHILADELPHIA • PENNSYLVANIA

Uniformity

Dependability in digitalization and maintenance

Sensible economy

Pil. Digitalis (*Davies, Rose*)

0.1 Gram (1½ grains)

Physiologically Standardized

Each pill contains 0.1 Gm. (1½ grs.) Powdered Digitalis, produced from carefully selected leaf of Digitalis purpurea, therefore of an activity equivalent to 1 U.S.P. XII Digitalis Unit.

When Pil. Digitalis (*Davies, Rose*) are dispensed on a prescription, the physician is assured that the patient receives digitalis in its completeness and obtains the full benefit of the therapy.

Trial package and literature sent to physicians on request.

Davies, Rose & Company, Limited

Manufacturing Chemists, Boston 18, Massachusetts

D21

TRIPLE Protection in only THREE INJECTIONS

QUICK, effective protection against three of childhood's greatest enemies is desirable, especially now when time is so precious to the physician.

Diphtheria-Tetanus-Pertussis Combined provides simultaneous immunization against these three diseases—and in only three injections. The first injection starts immunization against all three.

Each cc. of this preparation contains: H. pertussis killed—10,000 million; diphtheria toxoid—0.33 cc. and tetanus toxoid—0.33 cc. The toxoids are adjusted to the 0.5 cc. human dose concentration so that in the complete treatment (three injections), the full amount (1 cc.) of each toxoid, as recommended by Public Health authorities, is injected. Write for literature.

The National Drug Company,
Philadelphia 44, Pa.

NATIONAL DRUG COMPANY

DIPHTHERIA-TETANUS-PERTUSSIS COMBINED A.P.

BIOLOGICALS, BIOCHEMICALS, PHARMACEUTICALS FOR THE MEDICAL PROFESSION

RARA AVIS

At *no* time, in *no* way, and under *no* circumstances is this product ever promoted to the laity. It is offered to the physician for use solely under his professional guidance as indicated by the dictates of his judgment and clinical experience.

White's NEO MULTI-VI CAPSULES

A potent, rationally balanced 9-vitamin formula, including all clinically established vitamins. The rationale and, too, the unique economy of White's Neo Multi-Vi formula is based upon this nutritional principle: All clinically established vitamins are provided in amounts that are safely above adult minimum daily requirements*—and at least equivalent to adult full daily allowances**, yet not wastefully in excess of the vitamin needs of the average patient for whom a sound multi-vitamin supplement is indicated.

FORMULA:

Each capsule contains:

Vitamin A	5000 U.S.P. units
Vitamin D	800 U.S.P. units
Thiamine Hydrochloride, U.S.P.	3 mg.
Riboflavin	3 mg.
Ascorbic Acid, U.S.P.	75 mg.
Nicotinamide	20 mg.
Pyridoxine Hydrochloride	0.5 mg.
Calcium Pantothenate	5 mg.
Mixed Tocopherols biologically equivalent to 3 mg. Alpha Tocopherol.	

In bottles of 25, 100, 500, 1000 and 5000 capsules.

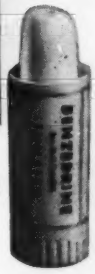
White Laboratories, Inc., Pharmaceutical Manufacturers, Newark 7, N. J.

*Promulgated in regulations of Food and Drug Administration, 1941.
**Recommended dietary allowances Food and Nutrition Board, National Research Council.

For the symptomatic relief of sinusitis...

"The benzedrine inhaler is an excellent vasoconstrictor and unless overindulged in, it may be used conveniently for long periods without deleterious results." Moore, J. H.: A Resume of Conservative Sinus Management, Southern Med. J. 34: 848-854.

The vasoconstrictive vapor of Benzedrine Inhaler N.N.R., diffuses evenly throughout the upper respiratory tract, opening sinal ostia and ducts which are frequently inaccessible to liquid vasoconstrictors. The sinuses drain. Headache, pressure pain, "stuffiness" and other unpleasant sinusitis symptoms are relieved. Each Benzedrine Inhaler is packed with racemic amphetamine, S.K.F., 200 mg.; menthol, 10 mg.; and aromatics. Smith, Kline & French Laboratories, Phila., Pa.



Benzedrine Inhaler

...a better means of nasal medication

A Fundamental Approach
TO SULFUR METABOLISM

HYDROSULPHOSOL

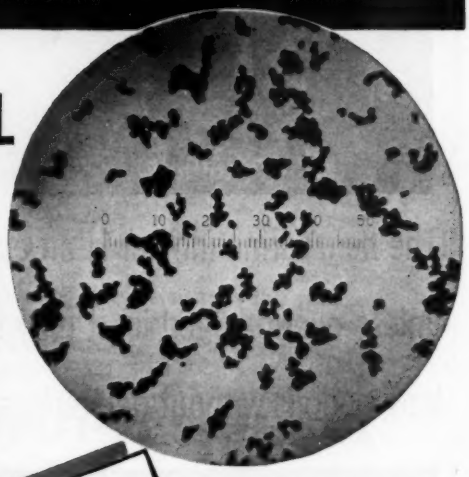


Illustration showing flowers of sulfur magnified 82X: small divisions = 10 microns. The size of the colloidal sulfur particle in Hydrosulphosol is estimated at 1/1000 of a micron or 1/10,000 of the small division particle illustrated.

A true solution of sulfur bearing compounds resulting solely from the reduction of flowers of sulfur by a catalytic process. In aqueous solution, it is capable of releasing its unusually high concentration of sulfhydryl ion in readily utilizable form . . . without evidence of toxic reaction.

Its therapeutic importance may best be evaluated by the fact that the —SH radical of the cysteine forms the active group in glutathione, alone of reported importance in connection with tissue oxidations.

Hydrosulphosol is indicated in the management of burns, ulcers and pathological conditions in which sulfur metabolism is a clinical consideration.

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REFERENCES

Rambar, A. C., Hardy, L. M. and Fishbein, W. I.: J. Ped. 23:31-38 (July) 1943
Wolf, I. J.: J. Ped., 22:707-718 (June) 1943
Wolf, I. J.: J. Ped., 22:396-417 (April) 1943
Wolf, I. J.: J. Med. Soc. New Jersey, 38:436 (Sept.) 1941

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EATON LABORATORIES Inc.
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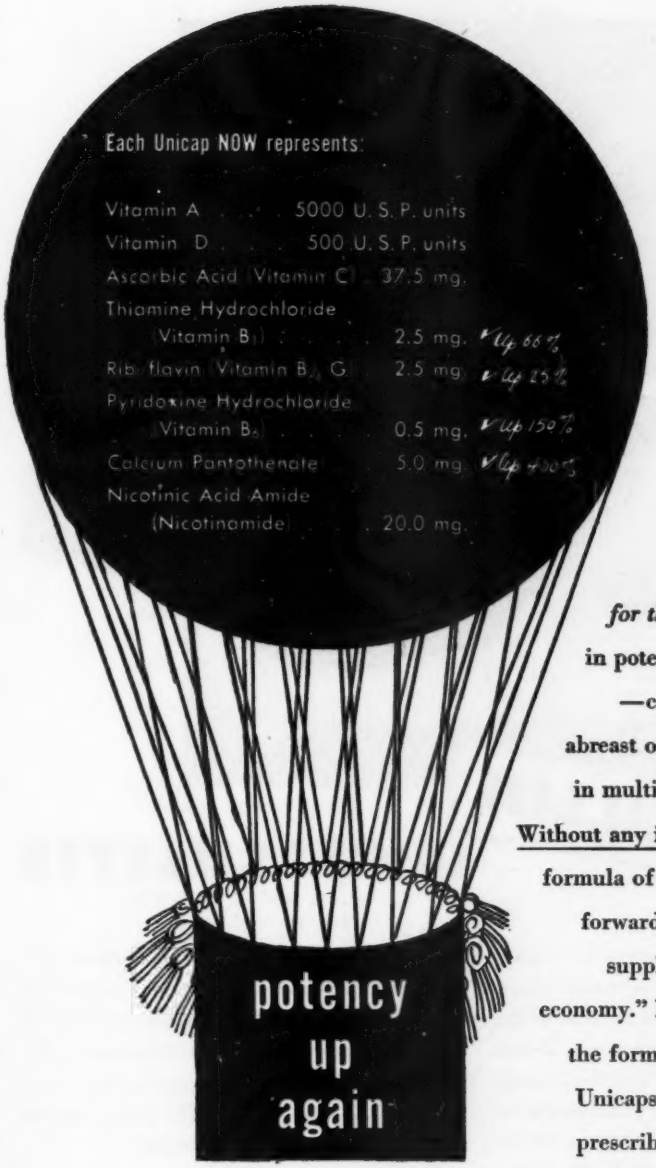
* In tests by modified Brown-Gamble method.

** Eastman, N. J., and Scott, A. B.: Human Fertility, 2:33-44.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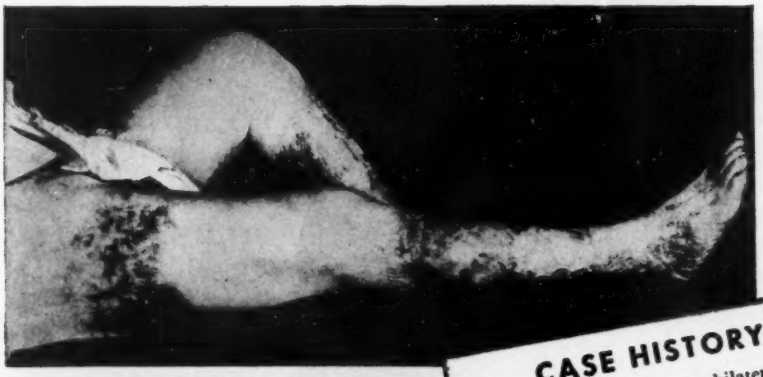

CASE HISTORY

White male, age 62. Severe bilateral varicosities of lower extremities, with cellulitis and thrombophlebitis of right leg. Responded to 30,000 units Penicillin, administered intramuscularly every 3 hours with recovery in 8 days.

PENICILLIN in CELLULITIS

Serious local infections such as cellulitis due to hemolytic streptococcic infections—with or without bacteremia—respond rapidly and dramatically to Penicillin.

Initial dosage of 15,000 to 20,000 units is advised. Constant intravenous injection of an isotonic sodium chloride solution follows, allowing administration of 5,000 to 10,000 units every hour, or 120,000 to 240,000 units in a twenty-four hour period. If this method is found inadvisable, 20,000 to 40,000 units may be injected intramuscularly every three or four hours.*

Bristol Penicillin, because of its low toxicity and freedom from pyrogens, its absolute sterility and standard potency, provides dependable therapeutic action.

For additional current literature on the clinical uses of this potent antibiotic, refer to your issues of the BRISTOL PENICILLIN DIGEST.

*Keefer C. S. et al.: New Dosage Forms of Penicillin, J.A.M.A. 128: 1161 (Aug. 18) 1945.

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Other products of Bristol Laboratories include high-type parenteral medications such as Epinephrine Hydrochloride, Liver Injection, Estrogenic Substance in Oil, and Phenobarbital Sodium.

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Oh, the gnawing, nauseous, digestion-mocking torment of a peptic ulcer! And the gratitude of its victim released from the wearisome pain and back to a full diet! His doctor is viewed as something between a scientist and a sorcerer.

Aluminum hydroxide treatment, so superbly exemplified in Fluagel, helps to that end. In fact, Fluagel is something of a sorcerer itself! It overcomes gastric hyperacidity by adsorbing hydrogen ions onto its colloidal particles. Yet it does not affect the acid base balance of the blood.

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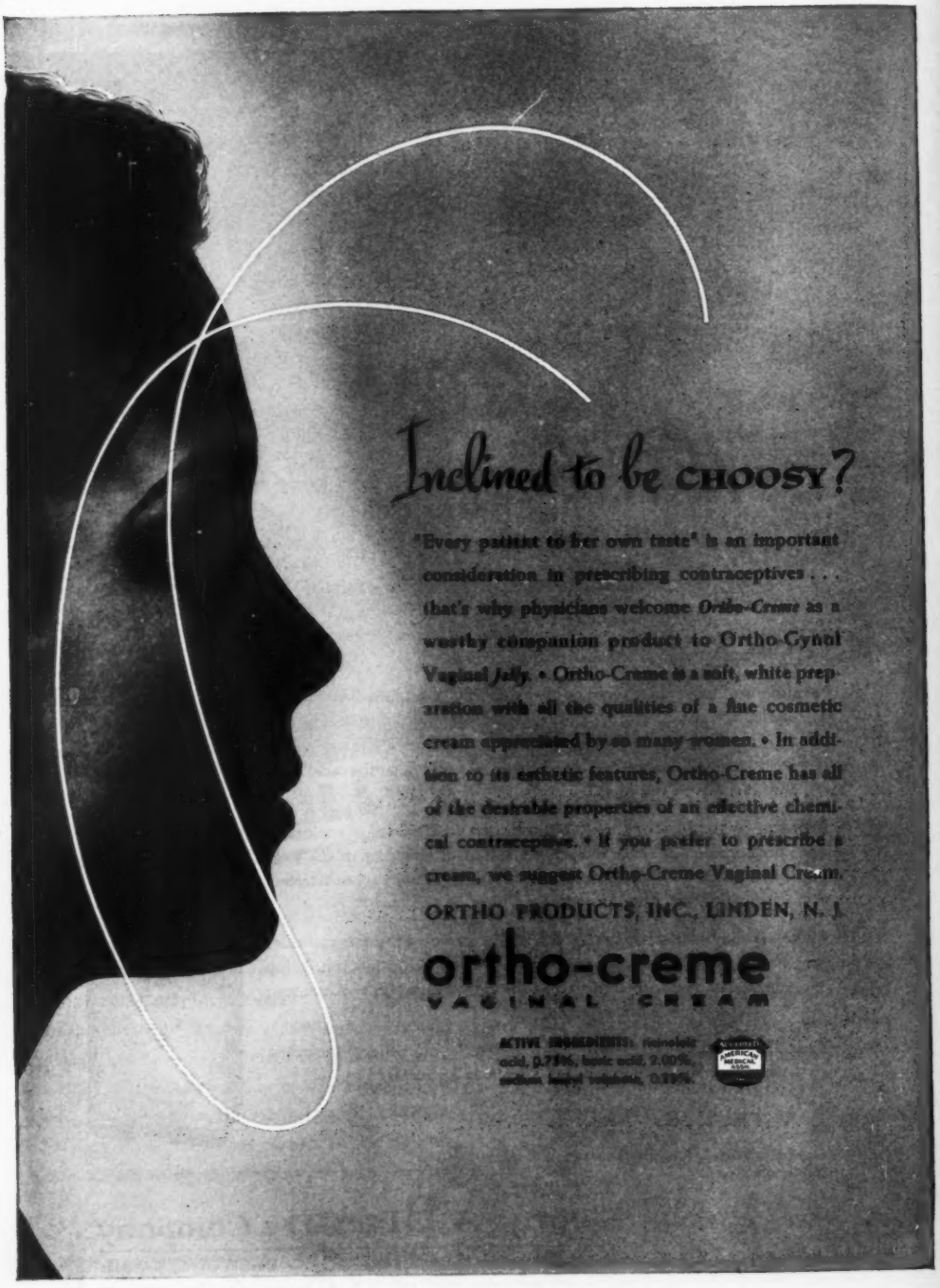
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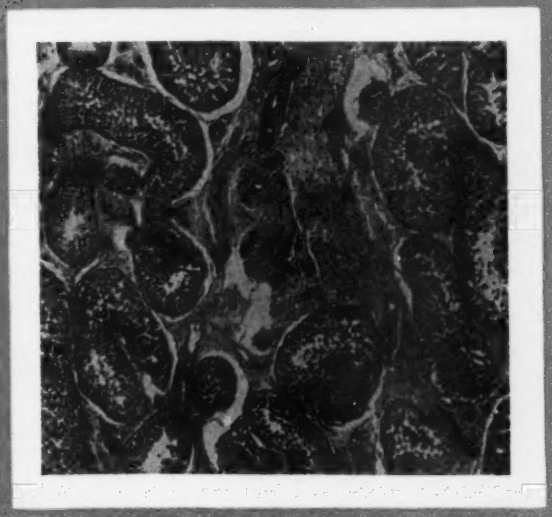

HUMAN TESTIS: Color photomicrograph. Transection of the tubules showing various stages of spermatogenesis. Male, 30 years of age.

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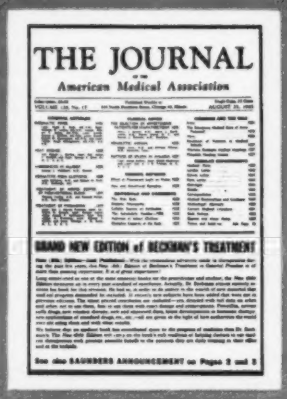
THE JOURNAL
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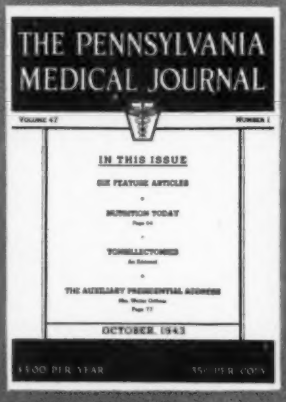
See also SAUNDERS ANNOUNCEMENT on Pages 2 and 3

THE MALE CLIMACTERIC

"There is absolutely no basis for the belief that the man does not have a decrease in sex function in later life and that he cannot have a climacteric. . . . Testosterone propionate, by intramuscular injection of 25 mg. three times a week, has been found effective in relieving the symptoms and in the production of a sense of well-being in the patients, which is the primary objective of this treatment. . . . Testosterone may also be given orally, by inunction and by implantation."—A. A. Werner.

Journal of the American Medical Association, 127:705, 1945.


THE PENNSYLVANIA MEDICAL JOURNAL

VOLUME 47 NUMBER 1

IN THIS ISSUE

SIX FEATURE ARTICLES

NUTRITION TODAY

TOMBILECTOMIES

THE AUXILIARY PRESIDENTIAL ADDRESS

OCTOBER, 1943

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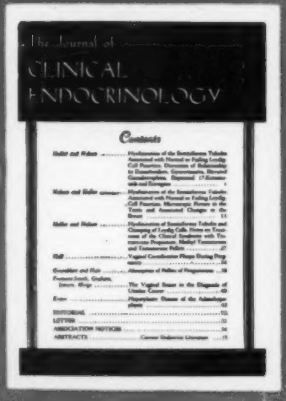
MALE HORMONE THERAPY

"As many as 34 different symptoms have been observed in the male climacteric; 20 of these are attributable to the nervous system and 9 of them to the circulatory system. . . . Under the influence of adequate hypodermic therapy 10 to 25 mg. of testosterone propionate two to five times a week, the average symptoms of the climacteric are usually relieved. . . ."—C. W. Dunn.

Pennsylvania Medical Journal, 48:780, 1945.


The Journal of
CLINICAL ENDOCRINOLOGY

Contents

CLINICAL USE OF TESTOSTERONE IN THE MALE CLIMACTERIC

"We wish to urge the careful study of men from 50 to 65 years of age when they complain of vague and often apparently unrelated symptoms, for evidence of the climacteric, and a subsequent use of testosterone propionate, in an attempt to relieve their suffering."—S. F. Goldman and M. J. Markham.

Journal of Clinical Endocrinology, 2:237, 1942.

The Male Climacteric, directly associated with declining testicular function, is amenable to replacement therapy with PERANDREN and METANDREN, the Ciba male hormones.

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is testosterone propionate in sesame oil for intramuscular injection. This ester of the male sex hormone produces a rapid and prolonged clinical effect. It is the only economical form of male sex hormone for parenteral therapy since non-esterified testosterone gives only a fraction of the response obtained with testosterone propionate. Available as ampuls, 1 cc. each, in concentrations of 5, 10 and 25 mg. Boxes of 3, 6 and 50.

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Perandren and Metandren Linguets
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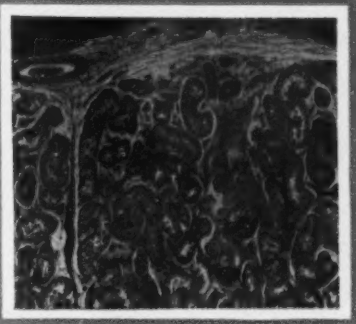
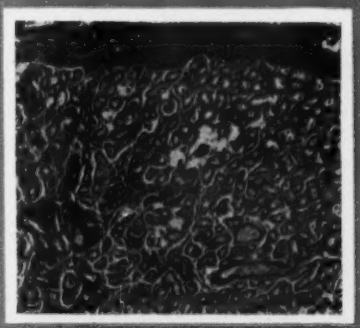


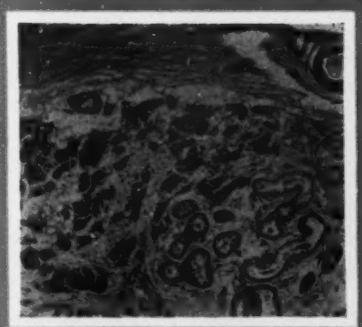
HUMAN TESTIS: Transection of the tubules. Normal male, 30 years of age.

2



HUMAN TESTIS: Transection of the tubules. Moderate atrophy. Male, 59 years of age.

3



HUMAN TESTIS: Transection of the tubules. Atrophy. Male, 68 years of age.

The above microscopic sections represent three stages of the testis in the male involution. The slides are Massen stained and photographed with Kodachrome Professional Film, Type B, 3¼" x 4¼".

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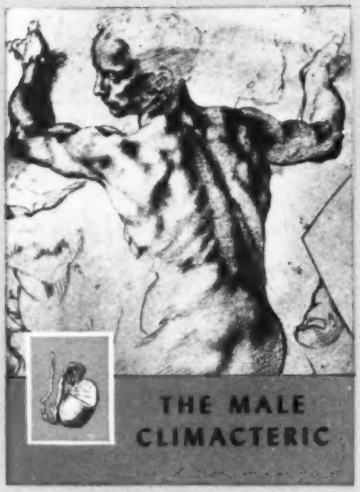
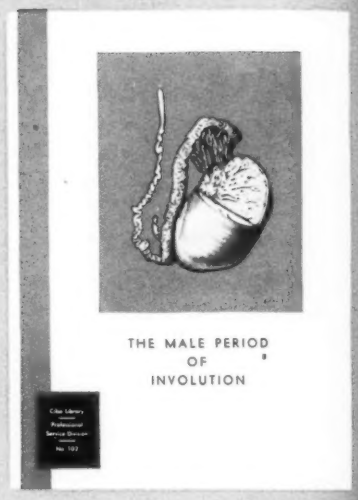
Ciba Literature of the Month





YOU WILL RECEIVE, DURING THE MONTH OF FEBRUARY, THE INTERESTING AND ATTRACTIVE FOLDER SHOWN ABOVE ON THE LEFT. THIS WILL GIVE YOU IN MORE DETAIL, YET IN CONCISE FORM, THE STORY OF THE SUCCESSFUL TREATMENT OF THE MALE CLIMACTERIC WITH THE STEROID HORMONES. IT WILL MAKE QUICK AND WORTHWHILE READING.

OFFERED AT THIS TIME, ALSO, IS No. 102 OF THE PROFESSIONAL SERVICE DIVISION'S LIBRARY SERIES. THIS FACTUAL SURVEY ARTICLE DISCUSSES THE RESULTS OF EXPERIMENTATION AND CLINICAL STUDIES ASSOCIATED WITH THE CLIMACTERIC SYNDROME AND PRESENTS A MOST EXTENSIVE BIBLIOGRAPHY. THIS IS SOMETHING YOU WILL WANT TO KEEP FOR REFERENCE. WRITE FOR IT ON YOUR LETTERHEAD.

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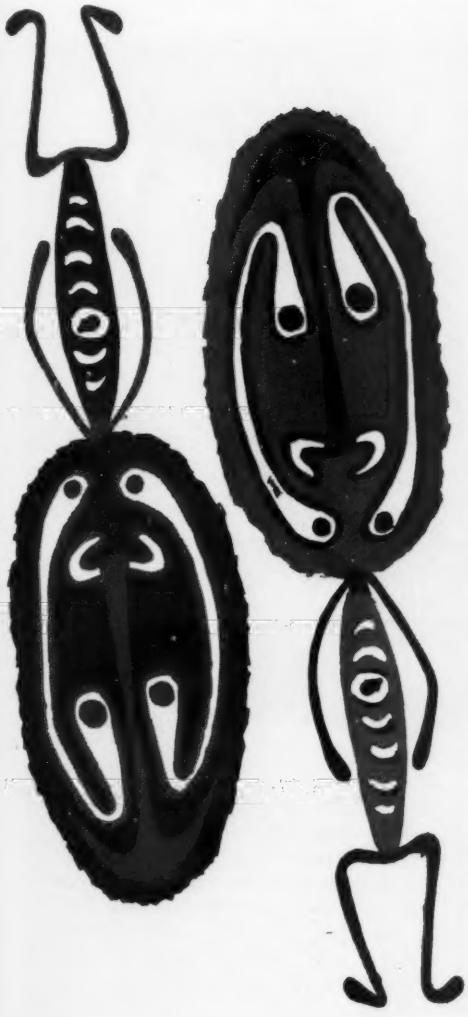

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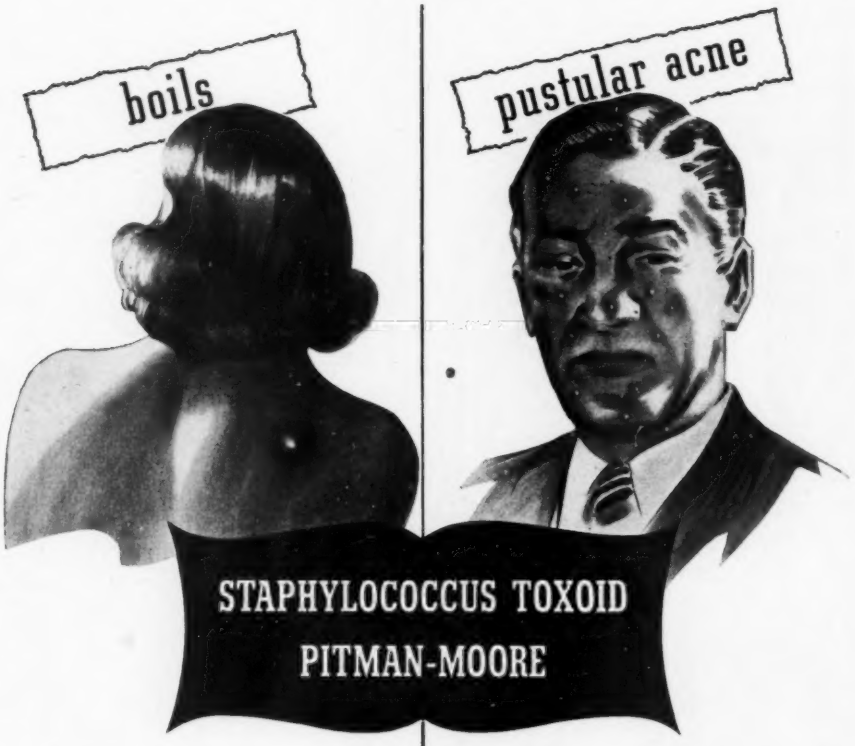

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[1] R. B. Greenblatt, Office Endocrinology, C. C. Thomas, Springfield, Ill., 1944.
[2] E. L. Sevringhaus, J. Clin. Endocrinol., 4:597, 1944.
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*Davis, C H.: Gonorrheal Arthritis Complicating Pregnancy Treated with Penicillin, Am. J. Obst. & Gynec. 50:215 (Aug.) 1945.

Hudson, G. S., and Rucker, M. P.: Gas Bacillus Infection of the Uterus Treated with Penicillin, Am. J. Obst. and Gynec. 50:452 (Oct.) 1945.

Woltz, J. H. E., and Zintel, H. A.: The Transmission of Penicillin to Amniotic Fluid and Fetal Blood in the Human, Am. J. Obst. & Gynec. 50:338 (Sept.) 1945.

Mitchell, R. McN., and Kaminester, S.: Penicillin; Case Report of a Patient Who Recovered from Puerperal Sepsis Hemolytic Streptococcic Septicemia, Am. J. Surg. 63:136 (Jan.) 1944.

White, R. A.: Puerperal Sepsis Treated with Penicillin, Southern M. J. 37:524 (Sept.) 1944.

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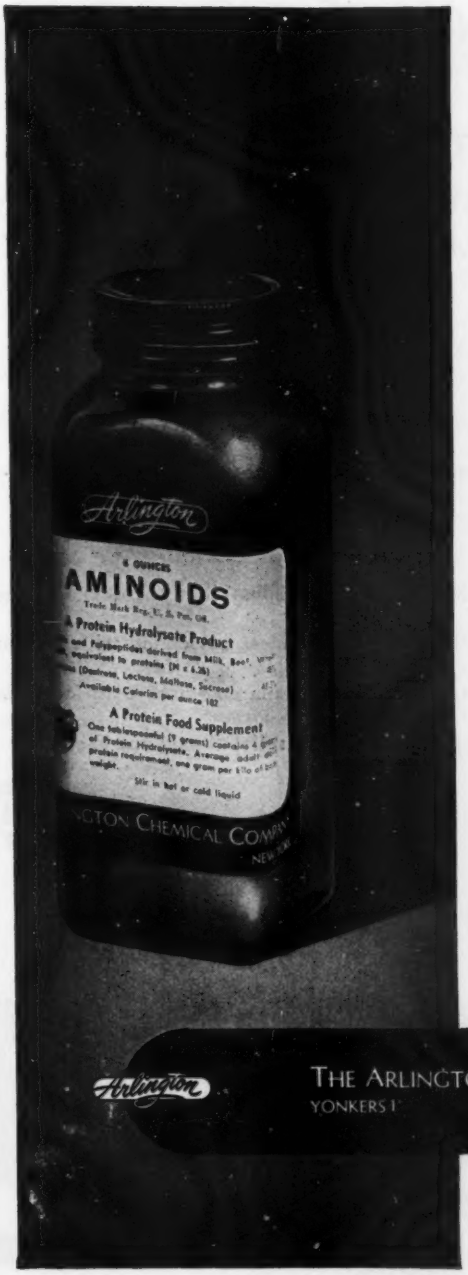

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1. Wilensky, A. O.: Surg. Gynec. Obst. 80:323 (Internat. Abst. Surg.) May, 1945.
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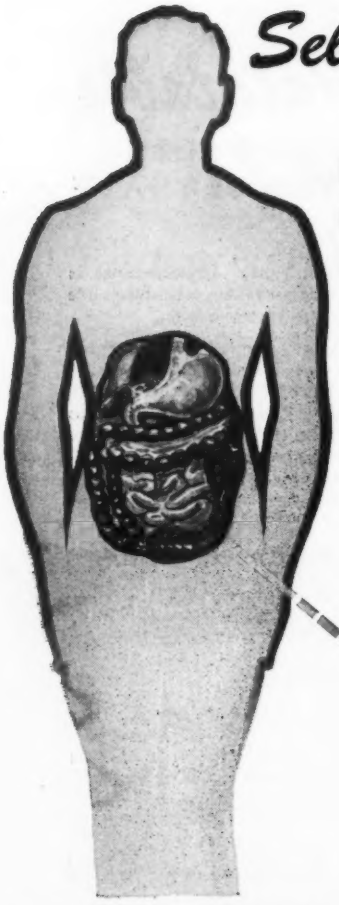

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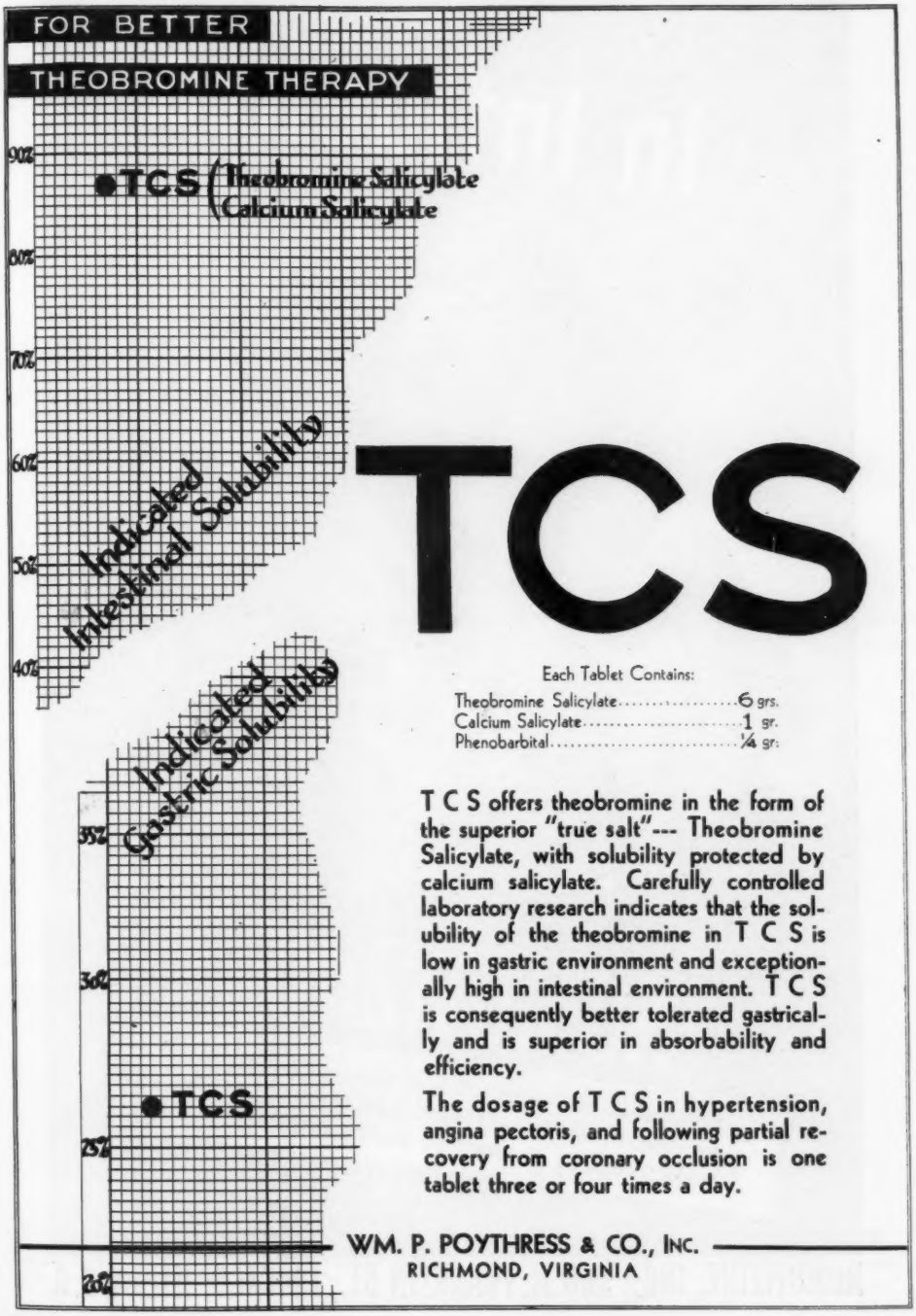

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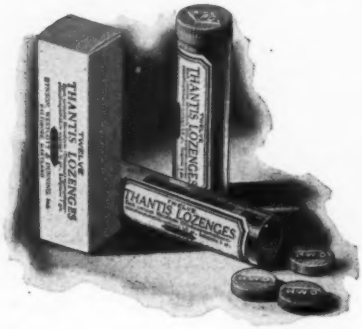

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THE CHANGING USE OF HOSPITALS BY THE MEDICAL PROFESSION*

By ROGER I. LEE, M.D.†
Boston, Massachusetts

It is a very curious fact that apparently the earliest record of a hospital dates back to India in the third century. I say it is curious because after this early record in India, hospitals and the hospital idea were for centuries very largely, indeed almost exclusively, associated with Christianity and with Christian activities. The early hospitals were asylums and places of refuge for wayfarers and travellers and usually operated by religious Christian orders. Many hospitals sprang up at the time of the Crusades. The hospital at a Swiss mountain pass is famed in legend.

It is worthy of note that not until much later did hospitals, except by the chance of proximity, play any considerable part in the almost constant wars of the world. Not until the time of Ambroise Paré and later of Florence Nightingale were there any real beginnings of war medicine and military hospitals.

The New England States did not feel the necessity of a hospital until nearly 200 years after the landing of the Pilgrims at Plymouth. Early in the nineteenth century the Massachusetts General Hospital was founded, only preceded by the Pennsylvania Hospital in Philadelphia. The Massachusetts General Hospital was actually designed as an asylum for the sick poor. It was taken for granted that a family with a home, no matter how humble, took care of the sick in the family in that home. An early Boston hospital was the Marine Hospital designed to afford asylum to sick sailors. Traditionally, sailors are wanderers and often homeless. An interesting feature of the early days of the Marine Hospital was that it was supported at one time in part by a form of insurance carried by some of the ship owners. After many changes and vicissitudes, the Marine Hospital has recently moved to the new buildings in Brighton and is now operated by the United States Public Health Service.

Slowly, with the same basic thought of affording asylums for the sick poor, special hospitals were established in this country. Maternity hospitals, or lying-in hospitals, as they were mostly called, were established fairly early, patterned after prototypes in the British Isles. The course of these hospitals was not infrequently hectic. Due to complete ignorance of bacteria, and of transmission of disease, pestilences of sickness and death, in this case puerperal fever or childbed fever as it was commonly called, invaded these hospitals. At times, these lying-in hospitals were closed by the authorities and again by the managers and sometimes by the refusal of patients to enter the hospital where death seemingly and too often actually lay in wait. The pertinent observations of Dr. Oliver Wendell Holmes on childbed fever fell on deaf ears and not until bacteria were discovered and the role of bacteria in the transmission of disease was understood, did the association of lying-in hospitals and possible death, because of residence in the hospital, slowly begin to fade from the mind of the public. Perhaps, again, it should be emphasized that it was only the homeless poor or the poor whose home was actually an inadequate shelter who sought asylum in lying-in hospitals.

The early story of the mental hospitals in this

*Address, General Session, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.
†President-Elect, American Medical Association.

country is a terrible one. These hospitals in New England were known as insane asylums; that is, asylums for the poor insane. At first, of course, the basic idea was that of an asylum for the poor with mental illness. Because of the numbers involved and the attendant expense, the asylums, then as now, were largely supported by counties or other governmental units. Perhaps because human nature is as it is and for other reasons, these asylums too often afforded in some instances opportunities of sequestrating people not actually mentally ill. These insane asylums gave custody to the insane poor and furnished nothing but shelter and food usually under fearful conditions. The less said about the custodial care in general the better. Out of this deplorable condition stood in bold and refreshing relief the McLean Hospital or Asylum in Boston. It was operated under the direction of the Trustees of the Massachusetts General Hospital. From its earliest beginnings, it was dedicated to the kindly and merciful care of those who were so unfortunate as to become mentally sick. Restraint, so common and often so terrible in other insane asylums, was kept at a minimum. Here, early the doctrine of the relief of suffering and of possible cure was stoutly upheld. In most, not all, of the other asylums no attempts at alleviation were made and the possibility of therapeutic care was not entertained. To the everlasting credit of Governor Benjamin Butler of Massachusetts, it must be recorded that Governor Butler fearlessly attacked this horrible situation. He succeeded in putting these county asylums under state control and Massachusetts now has magnificent state mental hospitals no longer called asylums, where mental patients are actually appropriately treated and sometimes cured and where custodial care is safeguarded to the interest of the patients. And yet there are lingering prejudices against the insane asylums.

It is not necessary to recount the story of the early contagious hospitals known as pest houses. These were fearsome places, authorized and maintained by the hysterical panic of the populace which took cruel measures in an attempt, usually quite unreasonable, to secure its own safety. The pest houses, however, were often the exception to the general fact that hospitals were asylums for the sick poor.

In the general hospitals, treatment of a kind was given and the general hospitals largely escaped the opprobrium of most special hospitals. With the increase in population, more general hospitals were established on what became a familiar pattern. Besides the privately endowed hospitals, like the Massachusetts General Hospital, there were hospitals under various religious auspices, St. Mary's Hospital in Rochester, Minnesota, the Baptist Hospital and the Deaconess Hospital in Boston, the Presbyterian Hospital in New York and more recently the Jewish Hospitals like the Beth Israel in Boston, Mt. Sinai in New York and the Michael Reese in Chicago. I am mentioning only a few.

Then the municipalities undertook to share in the responsibilities of the care of the sick, such as the Boston City Hospital, the Bellevue Hospital in New York and the Cook County Hospital in Chicago. The basic thought always was the care of the sick poor.

However, this basic idea gradually was subjected to the impact of developments in medical science. These developments probably seemed gradual at the time, but in retrospect they seem abrupt, exciting and indeed revolutionary. The discovery of anesthesia, the discovery of bacteria, and an understanding of the relationship of bacteria to disease, were perhaps foremost. It made operations a safe procedure in therapeutics. When Dr. Reginald Heber Fitz conclusively demonstrated in the 1880's the essential facts of appendicitis, literally a new era began. Hospitals took on a new significance and a new importance. The flaxseed barrel disappeared from the wards. Steam sterilizers appeared. The surgeon took off forever his Prince Albert coat and reappeared in a white robe. (I believe the present fashion is a gray blue affair). Interns and nurses appeared in flocks as if by magic. All these things are expensive. Patients began to be charged some fraction of the cost. With advent of the x-ray, the human body lost its last vestige of privacy. Into the innermost recesses of the human frame went the knife, seeking out disease, in the brain, the heart, the lungs, regions just a little while before taboo until after death.

And these advances were by no means confined to operations, which are only one form

of therapeutics or treatment. In the laboratory germs were pursued and identified. Mysterious tests made startling disclosures. A few drops of blood tell the story of a man's life. A little urine enables a laboratory worker to decide if a woman is pregnant. There are sera and chemical substances and a harnessed mould that have taken away many of the terrors of pneumonia and of other diseases. There are glands and hormones which shape our destinies far more than the stars ever did. There are vitamins that crowd calories off the dietetic stage. And the end is not yet.

Gradually the community began to query the basic idea of hospitals for the sick poor. Germs wage totalitarian war. Disease is no respecter of persons or of homes. Into the hospital for the sick poor were crowded all sorts of equipment, x-ray machines, electrocardiographs, basal metabolism machines, operating rooms and operating instruments. At a relatively early period, operations were done in the homes. The kitchen table, if not too flimsy, made a fair operating table. Kerosene lamps gave a poor light for operations, especially when held by a member of the family whose hand wavered as he wondered if he were going to be sick or faint or both. How surgeons and patients survived some of the early tremendous operations in the home, for example, where the patient had to be carried by the strongest doctor down and up a flight of stairs, remains a mystery. The next evolution was what the British call (and if you believe it still use) the nursing home for the well-to-do. These were all relatively small. The only advantages that they possessed were (1) possibly an elevator; (2) usually an orderly so-called with a truck; (3) an operating room; (4) a store-room for supplies; (5) running water here and there; (6) usually, not always, iron or brass beds. Too often these nursing homes were made over private houses. Sometimes the carpets and stuffed chairs were kept for the home-like appearance. I still shudder at the recollections of the wall paper and shabby elegance of some of the ornate trimmings.

Outraged human nature refused to countenance this preferential treatment of the sick poor. Then, too, in the newer parts of this country, unhampered by traditions, hospitals began to be operated for all walks of life. Thus the traditional basic idea of a hospital as an asylum for the sick poor changed. A hospital now strives to serve a cross section of the community. Perhaps I may be allowed to be mischievous enough to point out that the trustees of the privately endowed hospitals were anxious to get the obvious benefits of their splendid institution for their families, or even for themselves, and at the same time those trustees, mostly sound business men, viewed with considerable apprehension a certain parallelism between prodigious advances in medical science and prodigious advances in costs. Consequently, it has often been possible for endowed hospitals, by enlarging their clientele, to better their financial position. This seems to me to be reasonable and fair, as long as an appropriate cross section is maintained.

But if the function of a hospital is to provide medical and surgical care to an appropriate cross section of the community, are we on a safe and permanent basis? I think not. I do not want to discuss at any length the special hospitals, for contagious disease, for tuberculosis, for mental illness and for chronic disease. However, I must confess to the belief that the fewer special hospitals there are, the better. It is true, I think, that the general hospital can get along nicely without the special hospitals, but the special hospitals badly need, for a variety of reasons, the contacts of a general hospital. As a matter of experience the general hospitals have a vigor and a professional competence that too often varies in special hospitals. I am glad to see a maternity wing in a general hospital. I am glad to see a children's ward and an orthopedic ward.

I have said that I do not think the present basis is a permanent basis for hospitals. In the first place, medicine is not static and, please God, it never will be. There will be changes and before the new hospital building is finished, the cold chisel will be busy making changes. I am by no means sure that our present concept is even approximately correct. I am reminded that when the pneumococcus germ was classified into over thirty varieties, every effort was made to produce an antiserum for each of these varieties at a perfectly colossal expense. Then came along the series of chemical compounds beginning with sulfanilamide and there are many

as yet unborn. Some of these chemical compounds are so efficacious in pneumococcus pneumonia that the use of antisera has been largely discontinued, and the investment of millions of dollars was lost. And penicillin may today or tomorrow oust the sulfonamides from their position of the favored drug in pneumonia. And after penicillin, what?

I look at some of the tremendous hospital buildings in New York City. Yes, I know that New York is a big city and I know too that the old time prejudice against hospitals no longer really exists in the present generation. The modern family living in a small apartment cannot be sick at home. The cynic says that the modern family only sleeps at home anyway. They eat at a restaurant or at a lunch cart, live in the car, the movies and night clubs, and work downtown. Is it reasonable to expose a patient with a feverish cold, or a twisted knee from skiing, to the elaborate equipment of a modern hospital? It certainly is not financially sound.

Every lay person has heard of the Mayo Clinic in Rochester, Minnesota, the Mayo brothers, the wonderful operations that are performed there, the remarkable examinations and treatments that are done there. For a long time there was not any Mayo hospital. To be sure there was the St. Mary's Hospital, run by devoted Sisters, where the Mayo doctors operated. Most of the patients at the Mayo Clinic never see St. Mary's Hospital. When you get off the train at Rochester, Minnesota, you go to a hotel. In one of the hotels, there used to be a large sign, "Guests are requested not to discuss operations at meals." Perhaps the sign has gone. I do not know. The story was that the sign was put up at the earnest request of the traveling salesmen who wanted to enjoy their food. After the hotel, your next stop is the Clinic Building, which is what we would call a much glorified out-patient or dispensary building. Here is where the work is done. In the meantime, you live in your hotel. If you are examined or treated medically, you stay at the hotel, unless there is something very, very special. If you are to be operated upon and only part with a tooth, tonsils, eye, or toe, you still stay at the hotel. Perhaps you go to the hospital for a large operation and even then often wind up at the hotel. Now I am no blind worshiper at the Mayo shrine, but I admire many individuals there and many things there. The Mayos have done a specialized thing extraordinarily well. Their problem is different from most community hospital problems. The Mayos started fresh. Most communities are trying to disentangle themselves from prejudices, traditions, and old buildings. The problem in most communities is a problem of the residents of the community. The problem at Rochester, Minnesota, is almost exclusively non-resident. Consequently, it would be futile to suggest that each community hospital build a hotel beside it. But there is something in the idea of classifying accommodations to meet varying intensities of illness and the varying needs for the equipment and for nurses. There is no actual problem so long as the patient pays his way and a little more. But what of the great middle class financially? If I read the signs of the times aright, they will flock to the hospital in increasing numbers for less and less severe illnesses and ailments. Of course, I agree that the welfare of the patient, rich or poor, is the only criterion of medical care within hospitals or without. Perhaps some ingenious person will design not a hotel, not a hospital, but a simple hostel, which may help solve the problem. Or perhaps the state will pay for this patient. Even so, it may be extravagant, wasteful or economically unsound. It makes no difference who pays.

An up-to-date hospital of today would consist perhaps of an observation wing for diagnosis, a major surgical wing, a major medical wing, an infirmary for ambulatory cases, not only intrinsically mild cases, medical and surgical, but cases who are domiciled (not hospitalized) for study, and also for convalescents and patients who are being rehabilitated. Perhaps there may be also a geriatric wing. I hope that the specialties will come into this general hospital. It will be very good for the specialties. In my opinion, it is easily possible to overdo the specialized segregation. Syphilis was once linked with dermatology. Nowadays, the gynecologist must know about hormones. The gastro-enterologist

must know physiology and psychology. The modern genito-urinary surgeon resents being classified as a venereologist and so on. Our specialties are continually changing their boundaries and should not be permanently or rigidly segregated.

It is certainly true that at the present time we have no clear estimate of the community need for hospital beds. The reasons for this lack are manifold. We have gotten into the habit of thinking that the desire of the public to utilize hospitals as modified by the necessity of paying hospital costs is the only factor. And consequently prosperity fills our hospitals as well as epidemics. But the need for hospital beds should be the need for hospital medical service to the patient, that is, the public. If more of us fit ourselves snugly into apartments, we are like travelers or the sick poor of another age. We need an asylum if we are ill. But perhaps we do not need a super hospital. And just at what point between necessity and convenience is it that a future statesman should be born in a hospital rather than in a log cabin, a cottage, or a palace may be hard to decide.

The policeman, when he sees a drunk who needs custodial care, must decide between the hurry-up wagon and the ambulance, and finally between the lock-up and the hospital. Both the policeman and the police surgeon occasionally make mistakes, and so do all doctors and even you and I. But how far are we going to go on the road of hospitalizing alcoholics? They are certainly ill, although the very wards to which they are admitted, resent them as well as the nurses who clean up the messes.

The medical charts of influenza, grippe and a hard cold may be identical, but in real life, the head of the family has influenza, the wife and children grippe and the maid servant a hard cold and so it is the hospital for us, home in bed for the wife, and sympathetic encouragement for the maid.

Then, too, there will be changes due to the prodigious advances in medical sciences. Even now, it is whimsically recounted that the doctor gives the patient with a high fever one of the new chemical compounds, flippantly designated as one of the "sulfa sisters," and remarks "if you are not better tomorrow I'll send you to the hospital." And sometimes the patient is better on account of the remarkable drug and does not need the elaborate equipment of the hospital. Even now there are surgical developments which promise to reduce the stay for a prostatic operation from two months to two weeks. And no medical scientist would deny the possibility in the not too remote future that the administration of a few pills may make prostatic surgery a rarity. But it is too utopian to believe that within any horizon that we today can envisage, there will not be need of hospital beds for some serious operative procedures and for accidents and injuries. There will be need of special hospital study for a few cases of diabetes and of pernicious anemia, even if insulin and liver therapy have made diabetes and pernicious anemia somewhat a rarity in the general hospitals.

In my own lifetime, I have seen, due to public sanitation, typhoid fever become a curiosity in hospital wards where once over half of the beds were occupied in certain seasons by patients with typhoid fever. The hospital will always be a diagnostic center, but that may not necessarily be the super hospital but perhaps something resembling the diagnostic clinic of the Mayo Clinic. The present day general hospital is a hospital for a short stay. It has a large and relatively rapid turnover. But there are factors which may alter this situation. With the relentless reduction of the morbidity and mortality rates, and with a reduction of the birth rate, the average age of our population is growing older. Inevitably the aging of individuals continues. All living things age and die. The present social trend is to relieve the family of much of its responsibility for the care of its members who are chronically ill, infirm or aged. Indeed the pattern of modern life gives a strong impetus to this trend. Do the real medical needs of the group require the modern super hospital? I have raised these problems but I deliberately leave them unanswered. A few startling medical discoveries may upset any prophecy. And per contra medical discoveries may make desirable, or necessary, the alteration and even the enlarge-

ment of the super hospital as conceived at this time.

It seems likely that within our visible horizon most illnesses will continue to be treated in the home. There are those who would like to see the hospital as a central force in the pattern of complete medical care. Those individuals believe that this can be accomplished by gradual changes in our concept of medical and hospital care. Then there are some who are impatient with evolutionary changes and who would revolutionize the present social structure as well as medical and hospital service in the social framework. There are those, too, who believe that illness is a responsibility of the government and that there is no place for the privately endowed hospital. On this point I may venture to express an opinion. I believe that the privately endowed universities are helped by the existence of the state and municipal universities and that the state universities are helped by the privately endowed universities. In some ways, state universities may seem more sensitive to popular opinion, but sometimes popular opinion turns out to be political clamor. Likewise, I believe that the privately endowed hospital on the one hand and municipal, county and state and federal hospitals on the other need each other and that each does a far better job because the other is in existence.

I have in these remarks tried to emphasize the desirability of flexibility in the concept of the hospital. I have tried to insist that the hospital be never fixed nor static. I regard the present American hospital as a pioneering feat in medical service. The hospital has not yet found itself, its destiny or its fixed place in either the social or medical order. The American hospital, as one finds it today, stands out as one of the greatest of American contributions to science, civilization and humanity. It is a matter of fact, not of opinion, that the American hospital is something far different and far superior to the hospitals in other parts of the world. Into the hospital has gone the best of American resourcefulness. But the thing that has made it really great is strict adherence to the principle that the hospital is merely a device to serve the patient.

DEMOBILIZATION OF THE MEDICAL DEPARTMENT*

By GEORGE F. LULL, M.D.†
Washington, D. C.

A few years ago some of you probably heard of my going about the country trying to get more medical men in the Army. We were faced with this problem. We had to have an adequate number of doctors to take care of our sick and wounded, to immunize them, to do medical inspections and physical examinations.

We were criticized in some quarters because they said we had too many doctors. We were told that if a village of fifteen hundred people could get along with two doctors, then fifteen hundred healthy young adults should be able to get along with fewer than two doctors.

Our utilization was based upon experience going back as far as the Civil War. We did a very poor job in both the Union and the Confederate Armies in the Civil War. We did the best job we could, but we did not do as good a job as should have been done. We did a very poor job in the Spanish-American War. We thought that we had done a good job in the First World War, and we did a good job in the First World War, but the medical situation has been handled far better and with much better results in this war than it was in the last. Medicine has advanced, the care of the sick and wounded has advanced, and the methods of military medicine have advanced.

Now the war is over, and we have reached the point of demobilization. Our Army is being demobilized very rapidly, notwithstanding what the newspapers say. General Marshall said the other day that the Army is not being demobilized; it is being disintegrated.

We made plans before V-E Day. When we saw that V-E Day was imminent, we made our plans for the demobilization of the Medical Department. We had learned some lessons from

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†Major General, Medical Corps, U. S. Army; The Deputy Surgeon General.

the First World War, and the mistakes made then were to be avoided, and some objective policy adopted. We knew that it was not good to give priority, so far as separation was concerned, to those individuals who were in the United States who could be demobilized most quickly, because that left the men who had served abroad to come home and finish up the job.

We had to arrive at a policy of first-in, first-out, to a certain extent and we had to recognize the adjusted service ratings which partially include this factor.

The Surgeon General appointed a board of officers to make a study of these things before V-E Day. This board had members from the Army Service Forces, the Army Air Forces, and the Army Ground Forces, to try to prepare some scheme for the fair demobilization of the Medical Department.

At that time, remember we were still at war with Japan, and we were in no position to formulate plans for a total demobilization, because we had medical officers in Europe who were going to be redeployed to the Pacific, both directly, and indirectly through this country. We had the load of patients coming home from Europe, and we brought home the 90,000 patients from Europe in less than three months.

At the separation centers which were set up, we planned to use about 750 medical officers. They have expanded now to a point where we have to use approximately 2000 medical officers at separation centers, and at separation points. Most of the separation points are manned by officers who do this as an additional duty.

At the same time that this plan was being made, before V-J Day, we had to allow for a large number of medical officers in the pipeline; that is, men coming home from Europe, being given leave, and then being put back in the pipeline to go to the Pacific. This took out of circulation a great many medical men. We estimated at one time that there would be several thousand men in the pipeline coming from Europe, on leave, going to the Pacific, and those returning from the Pacific.

The Separations Board set its sights very low, and we figured at that time that we would be able to release seven thousand doctors by April, 1946. Remember, that was when Japan was still in the war. Four thousand of these were to be released by the first of January, 1946. This policy was adopted in July, and we started to release a certain number of doctors. In July we released only four hundred, and in August nine hundred. Then came the end of the war in the Pacific, which altered our plans.

We had seen the end coming, and we had been able to modify the plans to a certain extent. On V-J Day, on the very day that the war ended, a large number of troops with Medical Corps officers among them, became surplus because they were no longer needed to staff projected operations against Japan. Some of you will remember as probably you had friends who were en route overseas with units. These were at Fort Lewis, largely. That is where most of the units were, and these men were no longer needed, but they were not ordered away from Fort Lewis at once. They stayed there for a few weeks because no one knew at that time what was going to happen when our troops went into Japan. We did not know whether it was going to be peaceful occupation, or whether fighting would start again, and we could not afford to demobilize and disband those medical units which were in training at Fort Lewis.

Of course, the number in the pipeline diminished, so that we had all those men who were being redeployed indirectly, and they were now sent directly back to the United States. Even the ships at sea, the ones near the United States, both in the Atlantic and the ones who had not proceeded too far in the Pacific, were ordered back to base ports in the United States, and the troops unloaded.

The criteria which were first developed were developed with a great deal of care. We took samples of the men. We had no records to tell how many children they had, but we did know about their length of service and how many months they had served overseas, and so forth, so we took samples from various theatres and from these samples we figured the criteria which were necessary for a man to be released. We were a little handicapped, however, on account of the situation with regard to specialists.

We could figure the numbers if we consider every medical officer of equal value to the

service, and of equal value to the treatment of the sick patient. We could readily arrive at the plans for cutting down the Army, if we could do that. Unfortunately, this is not the case. There are certain specialties in which, as a matter of fact, there are too few men in the entire United States to do an efficient job because the job is not required in peacetime. Plastic surgeons, for instance, and neuro-surgeons, these two specialty groups. There are a few of them in the United States, and there were many, many cases requiring the services of plastic surgeons and neuro-surgeons; so that we had to figure our requirements relative to the specialists as well as the ordinary run-of-the-mine physician.

These criteria were announced and the specialists had to have more points than the ordinary non-specialists, before they could be released. They were figured out very carefully. I remember someone on the Board raised this point, and said, "All right, we have not enough plastic surgeons. What is going to happen when we release a lot of plastic surgeons?"

Our statistician said, "I have checked all the plastic surgeons and I find at the most only four will be released." So we knew we had put our criteria high enough not to lose all of our plastic surgeons.

After V-J Day, we reestimated these criteria, and General Kirk appeared before a Congressional Committee and told them that we would discharge, in his opinion, thirteen thousand doctors by the first of January. That was almost one-third of the Medical Corps of the Army which would be out by the first of January. We knew that we could do that if all things were equal, and we got the men back from the various theatres, but the men were not coming back very fast from the theatres. They were being held over there for various reasons, and we were a little jittery about whether or not they were going to get out.

We said that with the Medical Corps officers, anyone who had an Army service rating of 80 points, or who was forty-eight years of age, or who had joined the Army before Pearl Harbor, could be discharged. We knew approximately how many of these men there were, and we knew we could get along after discharging these men.

We had projected our hospital load, and remember that we have at the present time over 250,000 patients in this country, so that there will always be a lag between the discharge rate of the Army at large and the discharge rate of Medical Department troops. The lag is caused by patients in hospitals, and some of these patients are going to be in hospitals for a long time. For instance, compound fractures of the femur are slow in healing; and there are 1200 spinal cord cases in Army hospitals at the present time. There are about, as I recall, nine or ten thousand amputees still in Army hospitals. All of these men have to be taken care of, and they require the best type of professional care; therefore, we simply cannot turn these doctors loose at once.

We had turned loose, discharged from the Army and returned to civil practice, since V-E Day, and as of November 9, (my figures are up to November 9 only) 12,163 Medical Corps officers. We were almost up to our 13,000 early in November, and we will go past the 13,000 mark before the end of the year.

We have also discharged 18,385 nurses, and 2178 dental officers; so you can see we are well past the goal that we shot at a few months ago.

These men are being discharged at about the rate of a thousand a week. There are many reasons why preference should be given to men who are required in their home communities, men who have family hardships, and men who are required for teaching. There are a thousand and one reasons why certain men should be discharged. It is very difficult for us to evaluate some of these cases.

We know when a man has eighty points, he can get out. We can figure the points ourselves, and we know if we have a man's record, if he is over forty-eight years of age, he can be relieved from duty; but other cases are the difficult ones to decide. For instance, a doctor told me this afternoon, "Yes, Dr. So-and-so was let out because of dire necessity in the community. He took his family to Florida for two months, as soon as he got out," so that the community still went without a doctor.

Another thing that you people at home are going to notice is the fact that when doctors are released from the service, many of them are

not going to go back to the places they left. I know that from the letters from them that go over my desk. The percentage is going to be quite high.

Dr. Barker told me that he figures 20 per cent of the men who entered from Connecticut are not going back to Connecticut, and, on the other hand, many men who entered from other states will go there to practice. I know in our own office there are many of these younger officers who have no intention of ever going back to the places they left, or perhaps not to the type of work they left. This is because they have made contacts with other men in the Army who have influenced them to go elsewhere, and there is going to be quite a change in the physician population in most of the states. California seems to be a favorite. From what I have heard, a great many of them are planning to go to California. I do not know whether the State Board out there will tighten up or not.

It is very difficult to sit in Washington and say who can be released. That has been passed to the War Manpower Commission. The Procurement and Assignment Service passes on whether or not a man is needed in his community. The man applies for discharge, and if his approved application reaches the Procurement and Assignment Service, the matter is investigated through the local Procurement and Assignment Officer, and it is sent over to our office with a forwarding endorsement recommending that this man be released, that it has been investigated and that it is a deserving case. They have been the people who have held the bag and who have done a wonderful job, because they have means of investigating, and we have not.

I know in one case we received a petition from certain prominent citizens in a small city in a certain state. We received at the same time a letter from the Chamber of Commerce, a letter from one of the banks, and a letter from some other important group of individuals, about a doctor who was badly needed in this town because he was a pediatrician and the children were going to die unless he got back. These letters were all sent in directly, and we sent them over to the Procurement and Assignment Service, and the State Procurement Officer wired in his answer that he had investigated and found that, at the beginning of the war, the town had two men practicing pediatrics. One man had gone in the Army; meantime, another man came in, and they still had two men practicing pediatrics; so, for that reason, he was not let out.

Many of these cases are cases of hardship in communities where older men have remained behind and now, as a result of working overtime, these men simply cannot keep up. Many of them have died, and a great many more have had physical infirmities set in which preclude their practicing medicine.

The only thing I want to say to you is to be a little patient with us, that we have to take care of patients. We know that there are many men abroad who should be discharged. We cannot discharge them until we get them home. Medical officers are being given a high priority on transportation coming from both theatres, but remember that while we want the doctors at home, there are many other groups who also want their people home. Every mother in the United States wants her own son home, and every wife wants her own husband home. Demands are made upon the theatres to get everyone home, and every transport that comes in is heavily loaded with just as many people as can be put on it in order to get the largest number home in the shortest period of time.

It is a long way out to the bases in the Pacific. It took me thirty days to go from the West Coast to the Philippines. A ship makes a turnaround in about two months and a half, at the best, and that means if the ship is unloaded quickly when it reaches the Orient. So one ship makes very few trips a year to the Orient, and these men, when they come home, are immediately sent to separation centers and are gotten out.

I think that by next April, or in the spring, at least, you will find that the Army has been cut down to such a size that most of the men who left the local communities, and who were your assistants and your associates, will be back home. There are a few of them who are going to stay in longer. They volunteered to stay, and it is not the ordinary run-of-the-mine man who volunteers to stay. It is usually a pretty high-powered specialist who says, "I see my job here. I know I have something to do, and I think I

can clear it up by next March or next April, and I am going to stay." These men are men who have made enormous sacrifices to come into the Army, and to stay in the Army.

It has been gratifying to see what the profession at large has done during the war, in giving up the things that it has given up, in leading the life it has led in the Army, all for patriotism, and only for patriotism.

The younger men who have graduated from college recently, and members of the A.S.T.P., we hope we can keep for a longer period. Those men who were educated at the expense of the Government should stay in for at least two years to help repay their education, but remember that out of about 34,000 doctors in the service today, 10,000 came directly from internships, so that one-third of the men in the service have never practiced medicine. They came directly into the Army from internships and many of these internships were only nine-month internships, so that we cannot turn the care of the wounded soldier entirely over to this group of men, no matter how smart they are. They have not had the training. Every day they stay in, many are receiving training, in hospitals where the soldiers are.

So before the passage of a year or two, these men will have had a certain amount of training, but it is a big problem, and we hope that you can bear with us until we get these men back home.

THE GENERAL PRACTITIONER AND RURAL MEDICAL CARE*

By B. A. Hopkins M.D.
Stuart, Virginia

During the past decade much has been said about the inadequacy of medical care in the United States. Often those speaking of inadequate medical care are referring to the so-called middle and low income group in both rural and urban areas, but just as frequently one hears the expression, "inadequate medical care, especially in the rural areas." I believe that you will agree with me that most of those who speak with authority concerning medical care are welfare workers, public health officials, sociologists, and so on. Occasionally one hears this subject mentioned at medical meetings, usually by specialists or medical college professors. So far as I know, little has been said by the general practitioner. I am a general practitioner in a small county-seat town, and shall present the viewpoint of one in daily contact with a middle and low income group, and a rural community.

A word might be said as to what is meant by the phrase "adequate medical care." The dictionary gives the following definitions to the word "adequate," namely: "Equal to, proportionate, fully sufficient." With these definitions, the term "adequate medical care" becomes somewhat ambiguous. However, accepting the last definition, we have the phrase "fully sufficient medical care" which should be satisfactory for this purpose.

The general impression seems to be that every individual would accept the best of medical care were it available, and that the greatest burden is on the medical profession to provide proper care. This is largely true, but it is not true in all instances. Unfortunately, there are a number of individuals who do not desire and will not accept medical treatment at all. This group consists of various religious sects, the ignorant, and those who still like to connect the mystery and magic of the dark ages with the practice of medicine. It has been my experience that many in this latter group will be found in both high and low income groups in a community. These people would rather go to a quack or charlatan than to the best trained and experienced physician.

As Dr. Pressly said in his address to this group last year,

> "It is the definite conviction of some of the outstanding leaders of the medical world that from eighty to eighty-five per cent of those seeking medical care could be skillfully and successfully cared for by a well-trained general practitioner."

After reviewing over two thousand consecutive individual cases of persons seeking medical attention in a rural community, I find that the

*Chairman's Address, Section on General Practice, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

estimate is conservative. My standard for judging the results is whether the patients were able to return to their daily vocations in as good or better physical condition than before they developed the symptoms that caused them to seek medical advice. Whether they were treated as efficiently and returned to health as quickly as they would have been, had they been treated by specialists in a large medical center, is a moot question. It is a question much like that of the man who had been taking treatment for some time without improvement, who said that he could not say that the treatment had not helped him, for he did not know how sick he would have been had he not received it.

It is not the purpose of this paper to contend that medical care in all rural areas is sufficient, nor to imply that specially trained physicians and large medical centers are not necessary. They are essential for any system of medical care.

Of two thousand, four hundred and thirty-nine cases reviewed, two thousand, three hundred and thirty-four were relieved. It was necessary to refer sixty-two cases to specialists or medical centers for diagnosis or treatment. Of this group and in the time covered, many more than those referred by me sought advice or treatment from various specialists. People have become specialist-minded and frequently decide for themselves by which specialty they should be treated. My opinion is that we general practitioners may be, to some extent, to blame for this attitude. We should not be guilty of knowingly or deliberately keeping any patient away from any other physician, should that physician be in a position to give the patient relief that we cannot give. Should we do this, we should bring reproach not only to ourselves but to our profession. If I might be permitted to give a word of advice to the general practitioner, I would say, know your capabilities and have courage to do without hesitation those things of which you are capable. If you are not capable of handling the case, be just as ready to refer the problem to someone whom you believe qualified. This tenet might apply to any physician. If we do this, everyone gains. The patient is benefited, and there is honor for the profession.

Of sixty-two cases referred to medical centers, or to specialists, thirty-seven reported for diagnosis or treatment and were cured; twelve reported, but their disease continued to progress and the patients died; six failed to report, or refused to follow prescribed treatment; six showed no change; and one, who was suffering from osteogenic sarcoma, improved temporarily, but later died. Of forty-one cases not referred, and not improved, thirty-four have died and seven are still enjoying poor health. These seven are of a group of individuals who always have complaints. They usually have some organic trouble, but nothing to justify the many and varied symptoms. They are an unhappy group that causes the general practitioner much worry and considerable loss of sleep. These people are chronic night callers, and you are assured when you are called that the patient is going to die in the very near future should your arrival upon the scene be one moment delayed. I suppose that these people do die sometimes, but it is usually long after most of us have passed to our reward.

There are many improvements that can be made in rural medical practice. Most of these needs must be supplied by the medical profession, if we would retain our present system of private medical practice. More physicians are needed in rural areas. For many years preceding World War II, there was a great tendency for young doctors just out of medical school and internships to locate in urban centers. The attractions of the city, no doubt, were somewhat responsible for this tendency. However, I believe that the lack of facilities in rural areas was just as big a factor in deciding these men to spurn rural practice. Young doctors have been trained to depend upon various and complicated laboratory tests, x-ray, electrocardiographs, basal metabolism apparatus, and other hospital facilities that the rural areas have not previously afforded. Many of the laboratory facilities and machines could be had for a price, but the cost was prohibitive. Even if the prospective country practitioner was so fortunate as to have the necessary money to purchase all this equipment, it still would not be a sound investment, as the income that he would derive from their use, would not net a sufficient return on the investment. Too often, if a hospital was in the community, it would be a privately owned and

closed-staff institution. The young practitioner would find himself in many instances serving more or less as a traffic cop, telling his patients which doctor or which hospital to go to. Incidentally, the cost to the patient for his illness increases with each reference. Whether there will be the same tendency for doctors to flock to the cities when the services release them and new graduates come out of the schools into civilian practice remains to be seen. Personally, I feel that even many of those who were practicing in rural areas before entering service are going to take up some specialty and seek a city practice, and unless country practice is made more attractive, the new graduates will not be interested.

It is not impossible to improve medical care in rural areas, and this can be done almost entirely within the medical profession. It would require the full cooperation of medical schools with their teaching staff, the specialists and the general practitioners. Medical schools are now helping by giving refresher and short postgraduate courses. The number of these could be increased. The men in the specialties could help by giving instruction and clinics; and last, but by no means least, the general practitioners could and should take full advantage of these courses. Hospitals should be open to all qualified physicians. Laboratory and other equipment could be made available by the cooperation of rural physicians. In a general section, one physician could be qualified to do certain laboratory work, another diagnostic x-ray, and still another electrocardiographic work. By doing this, the cost of expensive equipment would be divided. It is true that this method of practice would make physicians more dependent on each other, but I think that this would also serve a good purpose. Consultations would be more frequent. Ideas would be exchanged, and without necessarily increasing the cost of medical care. An organized and planned program sponsored by local medical societies for the purpose of educating the general public as to what may be expected of medical care should help considerably when we as physicians must deal with those individuals who make up the community.

SUMMARY

Medical care in rural areas is a definite problem in the United States. This condition is due largely to the shortage of physicians and lack of modern hospital and laboratory facilities in rural areas. Much can be done to relieve the present situation by the cooperation of the members of the medical profession.

RELATIONSHIP OF STATE AND LOCAL HEALTH SERVICES IN THE WHOLE PROGRAM OF PUBLIC HEALTH*

By HARRY S. MUSTARD, M.D.†
New York, New York

This is a difficult subject to discuss. There is danger that one may remain so general as never to come to the point, or, might get into such a snarl of details as to neglect completely any consideration of the general principles involved.

A discussion of state and local health services is further complicated, and in forty-eight different ways, by the fact that there are forty-eight separate states, each of which looks at and does things in its own way. What is satisfactory and even required in one state might be a serious breach of precedent or law in another. There is the fact, too, that public health services draw from a number of different professions, each of which is to some extent guild conscious; and there is ever present the problem of central versus area administration.

These things, in their various ramifications, have an influence upon the relationships of state and local health service in the whole program of public health, and in the circumstances, it would perhaps be best to shape this discussion so as to explore certain general principles, on the one hand and, on the other, to select for attention a few specific interrelationships that may serve as typical or illustrative.

STATE AND LOCAL GOVERNMENTS

Inasmuch as a health agency, be it federal,

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†DeLamar Professor of Public Health Practice and Director, School of Public Health, Faculty of Medicine, Columbia University College of Physicians and Surgeons.

state or local, must operate within the legal and economic framework of the governmental jurisdiction of which it forms a part, a brief resume of the general relationships of the principal political units in the system of government of the United States seems in order. Disregarding here, the fact that state-local relations are considerably influenced by federal activities, it may be said that the units of government most concerned are state, city, county and township. The latter, though of importance in the northern part of the United States, particularly in New England, has a somewhat shadowy political function in the South and will not be considered further in this discussion.

The state is the keystone against which was built government in the United States. From joint action of the states the Federal Government received its power and responsibilities, and each state individually, has delegated varying degrees of local government to its contained sub-jurisdictions. Originally, the theory of state-local relationships in general affairs was simple and somewhat as follows: The state gave to local jurisdictions the authority to collect taxes within designated limits, to elect local officials for the conduct of its proper affairs, to expend tax funds for, and prosecute certain specified activities in accordance with state laws and in proportion to local initiative and wealth.

In such circumstances administrative responsibility and authority of the state on the one hand, and of cities and counties on the other, were fairly clearly separated. Seldom were there any cooperative undertakings or problems as to who had primary jurisdiction in a given situation. Thus, in ordinary circumstances, the sheriff or chief of police, rather than state militia enforced the laws; and the local superintendent of schools rather than the state superintendent of education, made the decision as to whether or not a given applicant was qualified to teach in the community's schools. In public health, the county or city did well or poorly for its citizens solely on the basis of local judgment and local resources.

This simple situation no longer exists in governmental activities. The demands of a changing order and economy have made it necessary that large units of government assume more responsibility for the kind and amount of service that the citizen receives. This has resulted in a situation wherein many affairs of government are carried on through joint activities of state and local government. The local governments remain, in most instances, the operative unit, and there has been no drastic change in the theory of state-local relationships. However, as the state has historically a superior authority and has currently heavy financial commitments, a new set of relationships have been and are now in the process of evolution. Any discussion, therefore, of the relationships of state and local services in the health program must be in consideration of this background; and in this connection, it would seem worthwhile to emphasize that in discussing these relationships one is more likely to bewail the difficulties that arise than to be grateful for the opportunities and benefits that accrue.

TYPES OF STATE-LOCAL RELATIONSHIPS IN HEALTH WORK

In order to point up this discussion and to move from philosophic and general considerations to day-by-day concerns, particular reference will be made to three areas of relationship between state and local health services in which arise both opportunities and problems. These are as follows: finances; personnel; direction of local programs.

Finances.—The relationship that arises from participation of both state and local authorities in the health department budget is mentioned first, not because it is more important than other considerations, but rather because it is an arrangement from which has sprung a large part of the changing relationships. In effect, the moment that a small unit of government enters into a cooperative agreement with a larger one, it has to a considerable extent, and usually more than it had thought, compromised its right to self-determination. Part of this is because it is now playing in faster company, part because money speaks in commanding tones.

Lest there be a misunderstanding here, it would perhaps be well to emphasize a conviction that this partnership financial arrangement between state and local health authorities has been sound and productive. Without it, there

seems little likelihood that the quality and diversity of local health services would, at this time, be nearly so commendable as they are. Parenthetically, it may be said that because of the stimulating and guiding influence of state health departments, many county health services are today of a higher type than in a considerable number of cities where state aid and gentle supervision are at a minimum.

Out of all these concepts and efforts, the situation is about as follows: The median local health budget is approximately at the rate of 68 cents per capita, with a range from nearly two dollars and a half down to a thin dime. Ordinarily, more populous areas have more money per capita than do the smaller ones. This median of 68 cents per capita falls somewhat short of the goal of a dollar, but it must be remembered that it is more than twice what it was fifteen years ago.

In addition to considering the amount provided through state-local cooperative budgets, it is important to consider the ratio of state to local contributions. Again, using a median figure, it is found that 29 cents per capita is contributed to the joint budget by the local health authorities; that is, 57 per cent of the total budget is made up of state funds.

As has been mentioned previously, this financial participation has given the state certain prerogatives, tacitly accepted by those local health authorities who operate under joint budgets. Some of these prerogatives, and their results will be referred to below under separate headings, but for the moment, it seems necessary to discuss other kinds of state responsibilities and opportunities in the budgetary and financial fields. First, it must be recognized that the amounts provided in local budgets are inadequate; second that in most places the amount necessary to make the budget adequate is not likely to come from local authorities; third, that about thirty per cent of the population of the United States has no health service in the modern sense of the term, and fourth, that the unserved areas have remained unserved in spite of pursuasion, exhortation and normal financial inducements. Here arises a nice question: Is it likely that areas not now receiving any health service, or even those receiving what is now called reasonably adequate service, will attain satisfactory budgets in the absence of mandatory legislation prescribing, on the one hand, a proportionate financial effort on the part of all local jurisdictions and, on the other, assuring that if such an effort is made, the state will participate to that extent necessary to provide a health service on a predetermined level.

Personnel.—Although the development of the merit system is changing the picture, the appointment of a health officer, or other local personnel, was normally an entirely local matter. The city or county was the only one paying its money and, correspondingly, the citizen took his chances on the selection made by a local board of health or other authoritative body. In theory, that freedom of choice remains with the local health authorities, but practically, the choice is a restricted one, and the state health department holds a veto power. This veto power is not exercised directly, but rather the opposite. Thus, though few state laws say unequivocally that local health personnel must meet standards set by the state health department, it has been the rule that the state health department will not enter into a joint undertaking with the locality unless personnel standards are met. And a very good thing, too, for every local health officer will sooner or later have brought on him pressure to appoint a native daughter who thirty years ago graduated from a forty-bed hospital training school and who has since gained fifty pounds. Now, for one reason or another, she suddenly becomes interested in public health nursing. What makes it worse is that she may be not only a pretty nice person, but distressingly well connected. Therefore, while this veto power of the state health department may constitute some curb upon local autonomy, it is a benefit that pays quite large dividends in ease of local personnel administration.

There is one feature in this relationship though, that needs further consideration. Operating under a system of personnel qualifications and recruitment, a state health department may easily take too great a part in placement of personnel. This is dangerous when it relates to filling subordinate positions in a local health department, particularly so if the appointment is in a specified category which reflects the major

interest of a division or bureau of the state health department, as in sanitation, nursing, tuberculosis. This is so important that an illustration seems justifiable. Assume that there is a vacancy in such a position in the local health department. The local health officer writes to the state health officer, or his representative for advice and assistance. From this point on, one of two things may happen. The state health officer sends a list of eligibles and the local health officer conducts negotiations with possible appointees; or, the state health officer or his representative, enters into correspondence or conducts interviews with possible appointees in relation to the local position. The latter procedure is to be deprecated. It has within it the explosive potentials of the split atom. It is likely to create a situation wherein the new appointee will feel primarily responsible to a bureau chief in the state health department, and because the latter occupies a more superior plane in the hierarchy of government than does the county health department, this newly appointed individual may go to the local job with a subtle but dangerous sense of independence of local direction. If he or she does, the local health officer or supervising nurse has a difficult problem to handle.

In effect then, while the state health department renders a valuable service in setting qualifications for various professional personnel, in determining eligibility and in recruitment, the entire undertaking may be jeopardized by an unwise procedure in filling positions in local health services.

Direction of Local Health Service.—The way in which local health services are administered in a given state is perhaps the most delicate index of state-local relationships. It is here that the greatest benefits or disabilities of joint undertakings will tend to focus and manifest themselves.

One of the first difficulties encountered in this connection is the question of whether direction shall be remote control from central bureaus or through area administration. It should be emphasized that this is not a problem limited to the joint operation of state-local health services, but is found in every undertaking that has functional specialists in the home office and district managers in the field. A decision or compromise has had to be reached in industry, labor, mail order houses, perhaps in the church. Certainly, it is a problem that has faced the armed forces, with their staffs and line and auxiliary services. And one of the peculiar things about this question, in so far as it relates to public health workers, is that a given individual's decision as to whether central or area administration is the better, changes with the position that he or she occupies. Local health officers, who once resented each visitor from the state health department, unless passport and visa had previously been obtained, have, on assuming duties in the central office, come to the conclusion that all local health officers are unreasonable, contentious and on the moronic side; and vice versa.

Except for these changes in attitude with change of perspective, one tends to cling to whatever opinions he or she has, in spite of argument and exhortation; and so it really matters little what is said here, even presuming that it might have within it a modicum of reason.

The two extremes that might be reached in the administrative relationships between state and local health departments are about as follows: In one instance the local health officer builds a wall around his jurisdiction, and his personnel, to an extent that if a local sanitary inspector meets the state sanitary engineer on the street, he looks the other way; or if a local staff nurse and the state supervising nurse accidentally encounter one another, each swears they are two other people. That is one side of the picture, one that occurs not nearly so frequently as the other extreme which is seen when bureau representatives of the central office visit the local jurisdiction, conduct business relating to local health matters, or confer with local personnel, and reach agreements and give direction, quite without reference to the fact that there is a supposedly competent health officer in charge. Probably few places today go to either of these extremes, for with experience has come a realization that it is quite practicable to combine the benefits of central office guidance and those of local initiative, into a smooth administrative mechanism. Such a mechanism,

however, necessitates three things. First, each individual must have one, and only one, person to whom he or she is directly responsible. Personnel of the local health department are responsible to the health officer; the health officer is administratively responsible to the state health officer, or one person duly deputized by the latter. One might here ask, what about the local health officer's responsibility to the local board of health. Legally, of course, in most places, ultimate authority rests with the board of health and strictly speaking the health officer is responsible to that board. However, there should be no conflict, for the modern board of health does not extend its authority into the actual administration of health work and further, by entering into a joint undertaking with the state health department, the local board of health has agreed, tacitly at least, to the type of administration implied under the contract.

The second essential in a mechanism, for ensuring both the benefits of central office expertness and local initiative, is to recognize, without equivocation, that all health work in the local jurisdiction is under the direction of the local health officer. Even in activities that have not been delegated to the local health authorities, as in state supervision of public water supplies, or malaria control, services should be tied into the local program and at least made to appear to be a part of it.

So far, all suggestions as to necessities for a smooth administrative mechanism tend to protect the local health officer's autonomy. These safeguards are important, but there is a third requirement for state-local relationships, as follows: Nothing must be permitted to interfere with the free flow of expert professional and technical advice from the bureaus (or divisions) of the state health department to field workers in the local health department; from nurses to nurses, from engineers to sanitary inspectors, from and to tuberculosis and child hygiene services. The nature of this advisory service is not administrative but is technical. Without such stimulation and technical advice local services are unlikely to remain alive and progressive.

Time forbids further discussion of this subject. Leadership in activities now in progress and in new developments is essentially a state responsibility. Direction of activities may best be done by someone everlastingly and competently on the job locally. A reasonable state health officer and a reasonable local health officer will make progress regardless of conditions. One unreasonable individual may spoil the most beautiful mechanism.

THE NUTRITIONAL STATE OF THE CIVILIAN POPULATION OF STUTTGART, GERMANY*

By JULIAN M. RUFFIN, M.D.†
Durham, North Carolina
and
CYRUS E. FRENCH‡
Boston, Massachusetts

INTRODUCTION

Under the direction of the Medical Department of the United States Army, a survey of German civilians in the American Zone of Occupation was undertaken (*Fig. 1*). The purpose of this study was to determine their state of health and nutrition. This work was begun early in May, 1945, and the initial survey completed about five months later. Plans have been laid for continuation of this study for the duration of the American occupation, or at least until it becomes evident that the nutritional state of German civilians residing within this area is satisfactory.

The survey was conducted by five nutrition teams, each consisting of: (1) a clinician with special training and interest in deficiency diseases; (2) a nutrition officer familiar with the composition of foods and accustomed to taking dietary histories; and, (3) a biochemist. Each team was equipped with the materials necessary for making certain laboratory studies in

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*From the Department of Medicine, Duke University School of Medicine, Durham, N. C.

†Consultant to The Surgeon General, U. S. Army.

‡Captain, Sanitary Corps, U. S. Army.

the field, such as hemoglobin, total proteins, plasma levels of vitamins A and C, and urinary excretion tests for nicotinic acid, thiamin, and riboflavin.

Since it was believed that those residing in rural areas and in small communities were apt to be well fed, it was decided to survey, for the time, the larger cities only, particularly those which had been badly damaged. All of the larger cities in the American Zone of Occupation have been studied at least once by one of the five teams (*Fig. 2*). This communication is based upon a survey of Stuttgart, the capital of the Province of Wurtemberg, in southwestern Germany. Its normal population was roughly 500,000 but at the time of this study there were only 300,000 inhabitants.

PROCEDURE

A representative sample of the civilian population, including all ages, both sexes, and various occupations was selected. This was done with the cooperation of the military government detachments and local German authorities. The sample was so chosen that it would represent a miniature population and the results would have statistical significance.

The examination was conducted in the following manner: the men were stripped to the waist, with shoes and socks off, and pants rolled up. The women discarded their outer clothes, shoes, and stockings (*Fig. 3*). A brief examination was made in each case, noting particularly the general development and nutrition, evidence of weight loss, the condition of the skin, eyes, tongue, gums, and teeth, the presence or absence of labial fissures, knee jerks, and vibratory sense, and evidence of edema. In about 25 per cent of

AMERICAN ZONE OF OCCUPATION

Fig. 1

CITIES SURVEYED

Fig. 2

Fig. 3
Method of Conducting Examination.

the cases, selected at random, hemoglobin and serum protein determinations were made and, finally, in about 10 per cent of the cases a detailed dietary history was obtained.

RESULTS

The nutritional state of the children and young adults was found to be generally good, while that of the middle aged and elderly individuals was fair only. Moderate to marked weight loss was noted in the majority of those over forty, and this was especially true of the aged. It is important to note that this weight loss had taken place over a period of five years, the maximum loss having occurred in the year preceding the survey. In spite of this weight loss, there was no actual cachexia, no nutritional edema, and no clear-cut evidence of vitamin deficiencies. A curious purplish-red color of the tongue was noted in roughly 25 per cent of the male adults. This was sometimes associated with cheilosis and occasionally with a subjective sensation of soreness. Rarely was papillary atrophy present. There was a high incidence of gingivitis. With the exception of a few cases of folliculosis, no skin lesions were observed. There was no calf tenderness. Loss of vibratory sense and knee jerks was common, particularly in elderly males. There was a high incidence of goiter and of varicose veins (*Tables 1* and *2*).

Laboratory studies consisted of the determination of hemoglobin and total proteins in both children and adults. These values were found to be within normal limits (*Tables 1* and *2*).

DIET

Under the German rationing system, there were normally seven classifications of individuals: four groups from infancy to the age of eighteen, heavy workers, pregnant women and nursing mothers, the remainder being classified as "adult normal consumers" (*Table 3*). The following foods were rationed: bread, meat, eggs, fats, potatoes, cereals, sugar, cheese, and milk. The bulk of the rationed diet consisted of bread and potatoes, but it should be

PHYSICAL FINDINGS
(Under 18 Years of Age—Stuttgart)
July 20-31, 1945

	Male	Female
Number examined	296	278
Average weight		
5 years	18 Kg.	15.8 Kg.
10 years	28.3 Kg.	27 Kg.
15 years	47 Kg.	46.8 Kg.
Average height		
5 years	111 Cm.	109 Cm.
10 years	137 Cm.	135 Cm.
15 years	164 Cm.	159 Cm.
Average weight loss, 15 years	0	0
No gain in weight (per cent) past year	36	36
General appearance (per cent)		
Normal	92	95
Fair	8	5
Poor	0	0
Edema	0	0
Muscle tenderness	0	0
Follicular hyperkeratosis	3	4
Dermatitis	0	0
Nasolabial seborrhea	0	0
Gingivitis	5	8
Cheilosis	0	0.4
Papillary atrophy	1	2
Glossitis	3	3
Blepharitis	0	0
Conjunctivitis	0.3	0.3
Pallor	0	0
Goiter	15	25
Diminished knee jerk	17	16
Purplish color of Tongue	6	4
Laboratory Examinations	18	29
Average hemoglobin (gm. per 100 c. c.)	12.6	11.7
Average serum protein (gm. per 100 c. c.)	7.4	7.4

Table 1

pointed out that the rationed bread was very dark, being made of the whole grain and, therefore, superior from a nutritional standpoint to bread made from highly milled white flour. The rationed food for Stuttgart at the time of the survey is shown in *Table 3*.

However, carefully taken dietary histories revealed that the rationed food usually was supplemented by other foods, such as additional potatoes, vegetables, fruits, jam, and beer. This supplement varied with the individual but on the average ranged from 600 to 1,000 calories per day. Although the diet was unquestionably monotonous, still from a nutritional standpoint, it was reasonably adequate, except in calories. The calculated average food consumption for the various groups is shown in *Table 4*. These figures, of course, apply only to the period during which the survey was conducted.

PHYSICAL FINDINGS

(Adults over 18 Years of Age—Stuttgart)

July 20-31, 1945

Normal Consumers	Male	Female
Number examined	833	843
Average weight†		
19-40	60.1 Kg.	52.7 Kg.
41-60	57.6 Kg.	51.8 Kg.
Over 60	64.4 Kg.	52.2 Kg.
Average height		
19-40	168 Cm.	160.6 Cm.
41-60	167.5 Cm.	157.6 Cm.
Over 60	167 Cm.	156.5 Cm.
Average weight loss past year	5.6 Kg.	5.8 Kg.
Average weight loss past five years	14.5 Kg.	11.8 Kg.
General appearance (per cent)		
Normal	91	96
Fair	9	4
Poor	0	0
Edema	0	0
Muscle tenderness	0	0
Follicular hyperkeratosis	1	3
Goiter	9	43
Nasolabial seborrhea	0	0
Gingivitis	35	38
Cheilosis	0.3	0
Papillary atrophy	0.3	1
Glossitis	3	3
Blepharitis	0	0
Conjunctivitis	4	0.6
Varicose Veins	28	31
Diminished knee jerk	24	20
Loss of vibratory sense (No. 256)	16	9
Purplish color of tongue	24	8
Laboratory examinations	95	92
Average hemoglobin (gm. per 100 c. c.)	13.6	12.3
Average serum protein (gm. per 100 c. c.)	7.6	7.6

†Using American tables for comparison, the average weight is roughly 10 per cent off.

Table 2

DISCUSSION

One was impressed by the marked weight loss which has been sustained by the majority of the adults over the age of fifty. In spite of this weight loss, there were no frank vitamin deficiencies, no nutritional edema, and no actual cachexia. The purplish color of the tongue which was noted in roughly 25 per cent of the male adults is difficult to explain, but possibly represents an early ariboflavinosis. However, many of these people gave a history of ingestion of large quantities of beer which might contain adequate amounts of riboflavin. It seems more likely, therefore, that this color change in the tongue was due to an early, non-specific B-complex deficiency.

The official basic ration was extremely low, being roughly 1,000 calories for "normal consumers." This was always supplemented by additional food available in the season at which the survey was conducted. It was impossible to determine accurately their caloric consumption, but carefully taken dietary histories would indicate that it was considerably below what would be considered adequate in the United States.

To summarize, one gets the impression that many of these people, especially those over fifty, were in fair health only and that continuation of the diet, which they were consuming at the time of the survey, might result in serious impairment of their health. The whole problem centers about the question of what caloric intake will be required to maintain the present state of health. It is felt that 2,000 calories per day for "normal consumers" as a basic ration probably would be adequate. If it is decided to import food into Germany, it is our belief that the only article needed is wheat.

BASIC RATION
(STUTTGART)
July 23 to August 19, 1945

Commodities	0-3 Years		3-6 Years		6-10 Years		10-18 Years		Adult Normal Consumers		Exp. and Nursing Mothers		Heavy Workers	
	Grams Per Day	Calories	Grams Per Day	Calories	Grams Per Day	Calories	Grams Per Day	Calories	Grams Per Day	Calories	Grams Per Day	Calories	Grams Per Day	Calories
Bread	90	224	160	398	207	515	268	669	207	515	207	515	386	961
Meat	—	—	18	26	35	51	35	51	29	42	29	42	43	62
Fat, all fats, butter incl.	7	52	7	52	11	82	11	82	14	104	29	216	25	186
Potatoes	143	93	143	93	286	186	286	186	286	186	286	186	286	186
Grain products (Nahrmittel)	18	62	18	62	36	124	36	124	18	62	39	135	36	124
Sugar	9	36	9	36	9	36	9	36	—	—	—	—	—	—
Marmalade, jam	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cheese, hard	—	—	—	—	4	12	4	12	4	12	4	12	4	12
Cheese, soft	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Milk, skim	—	—	—	—	125	43	125	43	125	43	—	—	125	43
Milk, whole	750	426	750	426	—	—	—	—	—	—	750	426	—	—
Total calories		895		1095		1051		1205		966		1534		1576

Table 3

CALCULATED ACTUAL FOOD CONSUMPTION
(Grams Per Person Per Day)
Stuttgart
July 20-31, 1945

	3-6 Years	6-18 Years	Adult Normal Consumers Male	Female	Exp. and Nursing Mothers	Heavy Workers
Number dietaries	5	49	41	40	17	5
Bread and grain	180	302	229	207	260	435
Meat	6	35	29	23	29	43
Oleo and butter	15	32	20	15	30	25
Other fats	—	—	—	—	—	—
Potatoes	580	741	828	723	582	780
Grain products	—	—	—	—	—	—
Sugar	9	9	—	—	—	—
Marmalade, jam	12	13	10	7	13	4
Cheese, hard	8	14	5	5	8	12
Cheese, soft	—	—	—	—	—	—
Milk, skim	—	125	8	15	—	64
Milk, whole	474	—	—	—	560	—
Eggs	3	3	6	3	6	3
Legumes	—	—	—	—	—	—
Vegetables	290	400	498	383	473	366
Fruits	70	272	218	130	148	220
Beer	—	130	227	61	150	440
Cider	—	44	82	46	77	—
Total calories	1641	2343	1994	1644	2278	2699

Table 4

Their diet is fairly well balanced at present, being deficient chiefly in calories. Since they use a high extraction flour, the addition of bread to their diet without meats or fats should not give them an improperly balanced diet, nor result in the development of vitamin deficiencies. To insure the prevention of deficiencies, one might consider the distribution of multivitamin B-complex tablets, although no evidence of their need was found at the time of the survey. Certainly this would be much more economical than supplying them with meat. The use of soybeans as a supplement to wheat might also be considered.

CONCLUSIONS

(1) The state of nutrition of the German civilians as determined by this survey was fair only.

(2) Marked weight loss has occurred in the adult population, particularly in those over fifty.

(3) The state of health of the infants and children was generally good.

(4) While there was little evidence of frank vitamin deficiencies at the time of our examination, still the color changes noted in the tongue may represent an early B-complex deficiency.

(5) A basic intake of 2,000 calories per person per day for "normal consumers" is believed to be an adequate amount.

(6) If it is necessary during the coming winter to import food into Germany to maintain such an intake, it is believed that wheat would be entirely suitable for this purpose.

A CLINICAL STUDY ON THE USE OF A PROTEIN SUPPLEMENT IN TREATING PERSONS WITH NUTRITIVE FAILURE*

By TOM D. SPIES, M.D.

and

MABEL M. MOREY

Birmingham, Alabama

With dramatic strides, the science of nutrition is focusing attention on the individual nutrients and the influences they exert in life processes. The day-to-day observations of many patients in a large nutrition clinic has led us to believe that the patient with nutritive failure has a deficiency of many nutrients and that what we see in the way of diagnostic criteria is the response of the body tissues to this inadequate intake of nutrients over a considerable period of time.

The response of a specific nutritional deficiency to specific therapy is truly remarkable. Following the administration of niacin to a severely ill pellagrin, his hallucinations, glossitis, and diarrhea disappear in a few hours; and he rapidly regains strength and vigor.[1] Thus, pellagra has come, by definition, to be a niacin deficiency syndrome. Dramatic as is this improvement in the characteristic symptoms of pellagra following the administration of niacin, the pellagrin frequently has associated symptoms which are not benefited by niacin therapy. Many have peripheral neuritis which is relieved by thiamine. Many have cheilosis and ocular symptoms which are relieved by riboflavin. A clear-cut syndrome of scurvy is not uncommon, and it responds only when the patient gets an adequate amount of ascorbic acid. Nutritional macrocytic anemia occasionally develops in persons whose diet has been inadequate in protein, and synthetic folic acid has recently proved effective in restoring a normal blood picture.[2,3,4] Thus, clinicians have come to realize that a person with nutritive failure has a mixture of deficiency diseases operating simultaneously and in varying degrees of severity.[5,6]

In our clinic we have taken the point of view that vitamins are by no means the only nutrients necessary to prevent or completely cure deficiency diseases. We are becoming increasingly aware of the extent of the protein deficiency in many diets and its role in nutritive failure. A number of years ago we showed[7] that persons with pellagra, beriberi, and riboflavin deficiency disease tended to eat a diet low in protein. We stressed the fact that the amino acids in which these patients were most likely to be deficient were lysine and tryptophane. We are studying not only the effect of individual amino acid on persons with deficiency diseases but also the effect of complex concentrated proteins, such as hydrolyzed casein. It is with some of the effects of one of these complex proteins that this communication is concerned. Extensive chemical studies of the plasma protein have been made by Mrs. Thelma Thomas, Miss Martha Bieler, and Mr. Robert Johnson. These studies will form the basis of a separate report. The clinical response of persons with general nutritive failure to casein hydrolysate can perhaps be illustrated best by the following case histories of two patients selected from a group of sixteen patients who had similar symptoms and responded equally well to similar therapy.

F. T., a 71-year-old white man, was admitted to the hospital in August, 1944, because of extreme weakness, dizziness, and numbness of his hands and legs. He had never had any serious illnesses or operations.

When he was 21 years of age, he started working in a steel plant as a sheet-metal worker. He worked steadily and earned a good salary until the steel plant closed, twelve years prior to his admission to the hospital. During the following years, he obtained only

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University of Cincinnati Studies in Nutrition at the Hillman Hospital, Birmingham, Alabama. From the Department of Internal Medicine, University of Cincinnati College of Medicine.

The tremendously heavy expenses of the general nutrition study have been borne by grants from a number of philanthropic persons, foundations and commercial concerns without which this study could not have been made. The necessary expense of frequent observations of these patients in their homes and in the clinic over a long period of time has been defrayed by grants from E. R. Squibb and Sons and from the Martha Leland Sherwin Memorial Fund.

occasional employment. His savings were used up two years after he stopped working regularly, and from this time on his income often was not adequate for his needs. Until his present illness, his appetite had always been good. He did not like meat, however, and had never eaten it more than once a week. When he stopped working regularly, he stopped buying meat because it was expensive and he had no desire for it. He had always included in his diet at least a pint of milk and one egg daily in addition to fruit, vegetables, bread, desserts, and cereals; but when he was out of work, which was frequently during the past ten years, he omitted milk and eggs (*Fig. 1*).

Nine months before coming to the hospital, he began having cramps, pain, weakness, and paresthesias of his legs and hands. Three months later he noticed general weakness and fatigue which was accompanied by dyspnea, palpitation, vertigo, scotomata, and tinnitus. At this time his friends told him he was "turning yellow." His symptoms became progressively worse, and six months prior to admission he gave up the occasional work he was doing in a grocery store. From the beginning of his illness he had had a gradual, progressive anorexia and had lost from 15 to 20 pounds in weight.

Physical examination showed a well-developed, underweight man who appeared to be chronically ill. His skin had a distinct lemon-yellow appearance. There were two large purpuric spots on the left forearm and one on the left hand. His lips were very pale, and the angles of the mouth were scarred and fissured with a small superimposed area of active cheilosis. The tongue was edematous, fissured, and red (*Fig. 2*). The mucous membrane of the mouth was pale and had a distinct icteric tint. The contrast between the red tongue and the pale gums was striking. The nail beds were practically white. There was pitting edema of the ankles and feet, as well as over the sacrum. Examination of the eyes showed pronounced paleness of the palpebral conjunctivae. The scleras were clear, as were the ocular conjunctivae except for a large vessel in the left

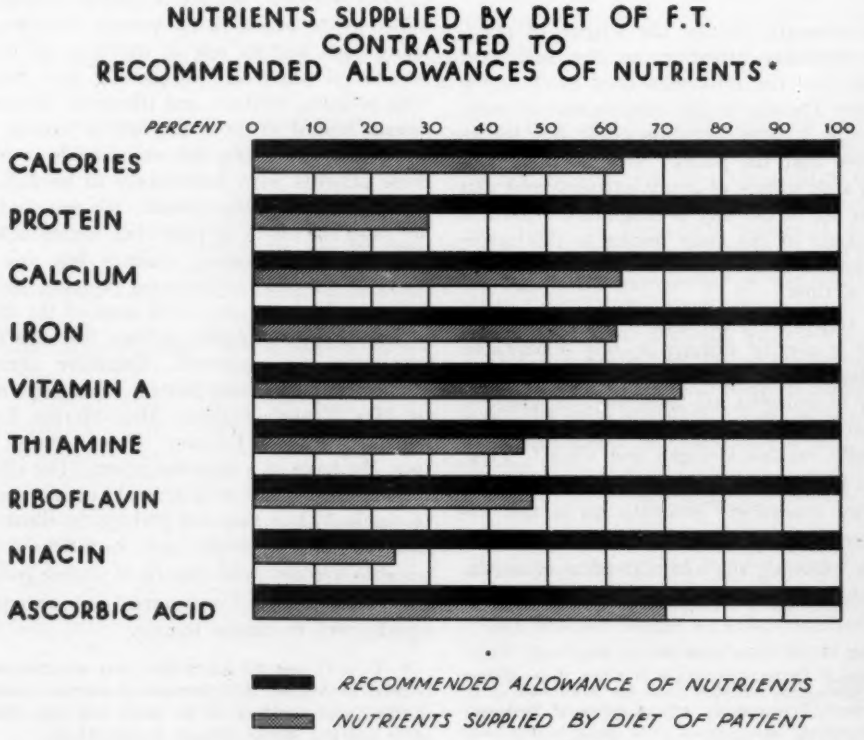

Fig. 1

eye. He complained of severe burning and soreness of the tongue.

Neurological examination showed that position sense was intact. There was hyperesthesia to pin prick in the margin around both elbows. Light touch perception was normal except for stocking hyperesthesia. Vibration sense was reduced 30 per cent in the arms bilaterally and 80-90 per cent in the legs bilaterally. There was no calf or sole tenderness and no nerve tenderness. The cranial nerves were intact.

Laboratory findings were as follows: red blood cells 1.87, hemoglobin 6.3 gm. (41 per cent), reticulocytes 1.8 per cent.

A diagnosis of pellagra, nutritional macrocytic anemia, and protein deficiency was made.

The patient was given 50 mg. of niacin amide every hour for ten hours. This therapy was continued for three days. At the end of 24 hours the redness of his tongue had decreased, and he said that it no longer burned. At the end of 48 hours all the redness had disappeared.

He was then given 1 c. c. of reticulogen daily for fifteen days. Two days after treatment was initiated, his appetite returned. Gradually he gained strength, and by the time he was discharged from the hospital, fifty days after admission, all his symptoms had disappeared except the edema of his ankles and feet. At the time he was discharged, examination of the blood showed red cells 2.60, hemoglobin 7.2 gm. (47 per cent), reticulocytes 1.2 per cent.

The red blood cell count and hemoglobin continued to rise; and three weeks after he was discharged, they were as follows: red cells 4.88, hemoglobin 11.8 gm. (77 per cent). Although he continued to feel well, the edema of his ankles and feet did not subside (*Fig. 3*). Serum protein studies showed that the total serum proteins were 4.78 grams per cent; the serum albumin was 2.77 grams per cent; and the serum globulin, 2.01 grams per cent. At this time he was given 50 grams of casein hydrolysate* twice a day for five weeks. During this time his diet consisted only of those foods he had been eating at home (fruit, vegetables, breads, cereals, desserts). Within a week the edema had decreased, and he volunteered that he felt better than he had for many months. At the end of five weeks the edema had disappeared. By this time the total protein was 5.79 grams per cent; the serum albumin, 3.25 grams per cent; and the serum globulin, 2.54 grams per cent. He was discharged from the hospital, and a week later he went back to work. Since this time he has had an adequate and well-balanced diet which included liberal amounts of lean meat, milk, and eggs; and he has had no recurrence of his symptoms.

N. F., a six-year-old white boy was brought to the Nutrition Clinic in June, 1943, by his mother because of "sores at the corners of his mouth" which had developed three months previously and had failed to heal. The following history was obtained from his mother:

This boy was the sixth child in a family of eight children. For several years the family income had been irregular and inadequate, and the whole family had subsisted on a grossly inadequate diet. All the children except N. F. had been breast fed until they were from 1½ to 2 years of age. When he was six months

*The casein hydrolysate was supplied by Mr. W. R. McHargue and Dr. Bacon Chow of E. R. Squibb and Sons.

Fig. 2
Photograph of man with edema and pellagrous glossitis. Despite the fact his red blood count was under two million, his tongue was very red due to pellagrous glossitis.

Fig. 3
Note bilateral pitting edema of ankles.

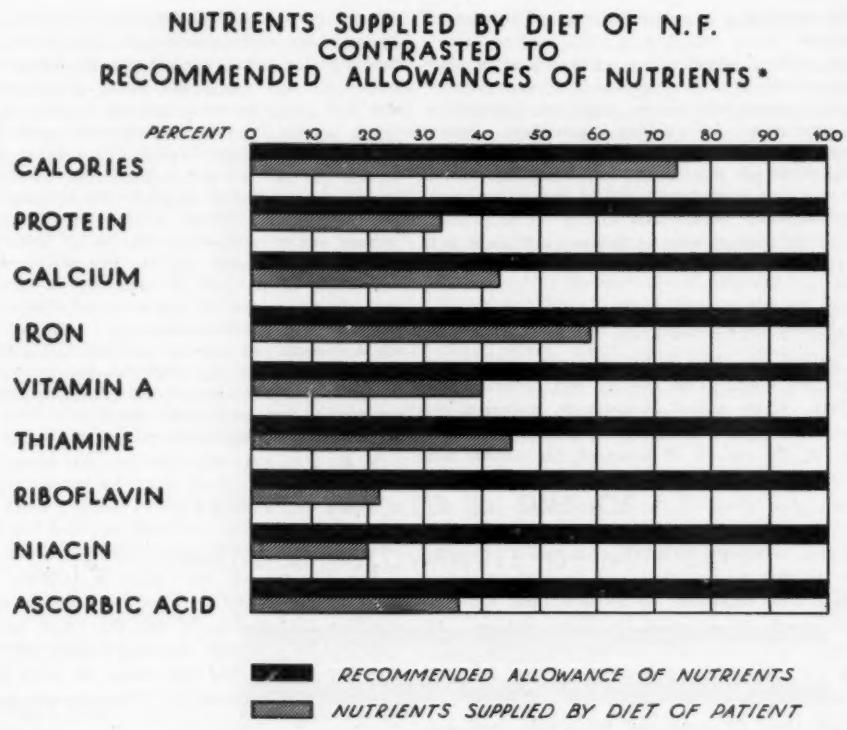

Fig. 4

Fig. 5
Note bilateral cheilosis.

old, the mother's health became so poor and her milk supply so scanty that she weaned him and began giving him the type of food eaten by the rest of the family. Since this time his diet had consisted chiefly of cornbread, biscuit, grits, syrup, potatoes, and salt pork. Occasionally a neighbor gave the family buttermilk but the child never had more than one or two glasses a month. During the spring he ate turnip greens once or twice a month. In the summer he ate tomatoes every day and occasionally ate a few wild berries. In the winter he had canned tomatoes about once a week and an egg once a week. *Fig. 4,* which is based on his daily food intake over a period of three weeks, shows the contrast between the quantities of nutrients supplied by his diet and the quantities recommended for an adequate diet.

The mother said the child had always been "puny" and had no "pep." He cried a great deal, was "cranky" and quarrelled with the other children. At night he was restless and "fretted" in his sleep. Frequently he refused to play with the other children because his legs ached. His appetite was poor and he often refused his meals. All his life he had had frequent colds. Four months prior to the time he came to the Clinic he had measles, and during this time he ate very little food. Two weeks later he developed severe diarrhea which

lasted several days. Soon after this, "sores" appeared at the angles of his mouth and they had never healed.

Physical examination showed a moderately well-developed underweight boy. At each angle of the mouth there was a moist macerated area about one-fourth inch in diameter (*Fig. 5*). Eye examination showed moderate injection of the conjunctiva of the right eye and an occasional dilated vessel in the sclera of both eyes. The calves of both legs were sensitive to pressure.

On religious grounds the parents of the child objected to his having blood taken. Accordingly, no plasma protein or other blood studies were made in this case.

The boy was given 10 mg. of riboflavin daily. Three days later the cheilotic lesions were drier, and within three weeks they had healed completely. By this time the injection of the conjunctiva of the right eye and the dilated vessels of the sclera of both eyes had disappeared. Since it was impossible for the family to improve the child's diet, the riboflavin therapy was continued. Eleven months later the cheilosis reappeared, and the child was so "sickly" his mother kept him out of school. The dosage of riboflavin was increased to 15 mg. daily, but after a month on this therapy the lesions still persisted and the child's general health did not improve. We then reduced the riboflavin to 10 mg. daily and began giving him 25 gm. of casein hydrolysate twice a day mixed with 4 ounces of water. One of the members of the Nutrition Clinic staff administered the casein each day and checked his food intake. This therapy was continued for eight weeks. During the first two weeks there was no change in the cheilotic lesions, but at the end of this time the lesions at both angles of his mouth had begun to heal and at the end of seven weeks they had healed completely. By this time he had gained five pounds in weight. An interesting point is that although the lesions showed no evidence of healing during the first two weeks on therapy the mother stated that at the end of the first week he seemed so much "livelier" and stronger that she sent him back to school. This improvement occurred despite the fact that his diet remained essentially unchanged. At the present time (fourteen months after the casein hydrolysate and riboflavin were discontinued), the boy is in good health and there has been no recurrence of symptoms.

SUMMARY AND CONCLUSIONS

Case 1 is representative of ten cases of combined deficiency diseases studied in the Nutrition Clinic at Hillman Hospital. This patient developed pellagra, nutritional macrocytic anemia, and nutritional edema following subsistence, over a long period of time, on a diet deficient in protein and other essential nutrients. The pellagra was corrected by niacin, but the anemia grew steadily worse. The anemia was corrected by reticulogen, but the edema did not disappear nor did he fully regain his strength until he was given casein hydrolysate.

Case 2 is representative of six children whose diets had been grossly inadequate most of their lives and who developed chronic cheilosis which disappeared following the administration of large doses of riboflavin. Despite the continued administration of riboflavin the cheilosis in these children reappeared and failed to respond to an increased dosage of riboflavin. Following the administration of casein hydrolysate the lesions healed completely and at the present time (fourteen months later) have not reappeared.

These observations support our working hypothesis that deficiency diseases seldom, if ever, occur singly and that nutritive failure cannot be permanently corrected by the administration of a single chemical substance if the diet continues to be inadequate. Nutritional deficiencies manifest themselves in a variety of ways and often evidence of only one or two deficiencies predominant in the clinical picture. Clinical evidence of protein deficiency is often absent or obscure. Nevertheless, in our experience, we find that it is common among persons who subsist on inadequate diets. We wish to stress that we have made other studies which show that patients with symptoms similar to those of the cases reported here responded well to protein derived from milk, meat, or eggs, whether or not it was hydrolyzed.

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POSTTRAUMATIC SARCOID-LIKE LESIONS*

By CHARLES O. KING, M.D.
Birmingham, Alabama

During 1875, when Hutchinson first described sarcoid or sarcoidosis, it was thought to be a disease of the skin, characterized by granulomatous infiltrations. Later, Besnier described similar lesions, which involved the face, ears, nose and fingers and designated the term lupus pernio. Boeck, later after histologic studies, recorded the term sarcoidosis and noted in addition to the cutaneous lesions, involvement of the mucous membrane as well as the lymph nodes. Kernisky and Bittorf, are of the opinion that the cutaneous manifestations are a part of a diffuse granulomatous disease.

Sarcoid manifests itself as a granuloma of distinctive type. No matter where the condition manifests or localizes itself, it produces an identical type of lesion, namely, infiltrations consisting of nodules of epithelioid cells; giant cells also are occasionally seen.

The lesion or lesions in the skin and subcutaneous tissue are painless, elevated nodules, reddish-purple violaceous in color and without subjective symptoms.

The size varies from a shot to a pecan. The sites of predilection are the face, forehead and less frequently, the extremities.

We do see superficial lymph node involvement, which is usually limited. These lesions never ulcerate and may undergo regression. Frequently, it is noted that the surface is covered with a fine network of capillaries.

Etiologic studies in the past have been directed chiefly toward the demonstration of the tubercle bacillus in the lesions of sarcoid. These attempts have been made through the use of many small animals; yet the results of most of these have been disappointing, nothing definite has been obtained and various organisms have been demonstrated. Allergic studies have been made relative to the proteins of tubercle bacillus, using human, bovine, and avian tuberculin.

There has been an increasing evidence favoring tuberculosis as the cause of sarcoid and at the present, there are more adherents to this belief, rather than any other cause. The demonstration of the bacilli is probably the most positive evidence of its tuberculous origin. Schaumann, who made a detailed investigation, favors the tuberculous cause and even goes so far as to incriminate the bovine stain. If sarcoids are tuberculous, Jadassohn's conception of their positive allergy is good, though an unimproved hypothesis. Yet, if positive allergy represents a high degree of immunity, it appears to me difficult to explain the long duration of some sarcoids; for as regards sensitiveness to tuberculin, the tuberculids come between lupus and sarcoids. As regards clinical evolution, sarcoids come between lupus and the tuberculids. But again, it must be remembered that immunity to tuberculin is not the same as immunity to living bacilli.

Other observers have not accepted the foregoing cause; some writers feel that they represent a disease sui generis.

The school that contends against the tuberculous nature of sarcoids argues that the tuberculin test is usually negative, that the bacillus of tuberculosis can practically never be demonstrated in the tissue microscopically, and that inoculation of guinea pigs with sarcoidal tissue will not cause tuberculosis in this animal.

A priori, it would seem that such arguments are difficult to establish and much careful work has been done to invalidate them according to Geockerman. Block and Poutier think it is a symptom complex which can be caused by various agencies.

The pathologic reaction is not specific for any group of bacteria and at present, the etiology is a confusing, perplexing and moot problem. We thought it wise, in view of the fact that the virus etiology of sarcoid has been discussed freely by many in the literature, to consider the problem of trauma as an etiological

*Chairman's Address, Section on Dermatology and Syphilology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

factor in this disease and bear in mind the possible inoculation by a foreign body of virus elements or conceivably some of the fungi. However, the fungi as a group may be ruled out, since they are microscopically demonstrable. The virus possibility cannot be ruled out by this method alone. My personal opinion is that viruses play absolutely no role in these lesions, which later we will consider.

It is interesting to speculate along the line of Harvell, who suggested that sarcoid may represent a non-specific response to a lipid fraction of varied organisms. It is conceivable that with trauma, there may be fat necrosis with the production of lipids, which could lead to this tubercle-like formation.

Nickerson's work on sarcoid, in its relation to virus etiology has been questioned frequently. His results have not been convincing enough to consider this seriously.

It has come to our attention in the last few years that lesions simulating sarcoids may be caused by a number of things. The most impressive demonstration, to my mind, was a series of six cases, all of them involving the forehead and face and one the mastoid region. In all six of these cases, the histology was almost identical to sarcoid and yet on further examination, in three of these, small, needle-like, crystalline structures were found, which were thought to be possibly fragments of glass. This raised the question as to whether glass, which is a silica compound, could or could not produce a sarcoid-like lesion.

The sixth case, an elderly woman, gave a history of a prick by a thorn while in her flower garden, a few weeks before the appearance of the lesion in the mastoid area.

Microscopically, no structures simulating silica could be found in this lesion, yet it had all the clinical and histopathological characteristics of a sarcoid. The diagnosis was made by three pathologists in different cities.

The histologic picture of all these lesions is that of a tubercle without central caseation, but with a typical epithelioid reaction and more or less typical Langhans' giant cells. Repeated attempts to demonstrate the tubercle bacillus were made to no avail. Micro-incineration was done on *Cases 1* and *2* by McMillan in an attempt to demonstrate the exact type of foreign material; yet due to the small amount and the inert nature of silica, the results were not clear-cut.

The whole question of sarcoid, which is a confusing one, probably should be reviewed and the term restricted to those cases in which no demonstrable etiologic agent can be proven. This would remove many, such as the six cases which we are reporting and describing and many other cases in which, with adequate examination, tubercle bacilli can be demonstrated. These six cases are entirely too small a series from which to attempt to draw definite conclusions. They may stimulate interest and investigation.

Case 1.—R. M., a white man, age 30, strong, healthy, and normal, when a boy, remembered a blow in the right forehead region. Several years later, a small shot sized nodule appeared and slowly but gradually got larger. On account of the cancer propaganda, he consulted his family physician, who attempted to remove this mass surgically.

Microscopic Report (*Dr. Casey*).—There is a cluster of apparently small tubercles, composed of monocytes without caseation necrosis. No foreign body giant cells of large size are seen although some contain large nuclei. No fungi are recognized. Tubercles are small and situated in skeletal muscle. No evidence of malignant change is noted. The diagnosis is sarcoid or

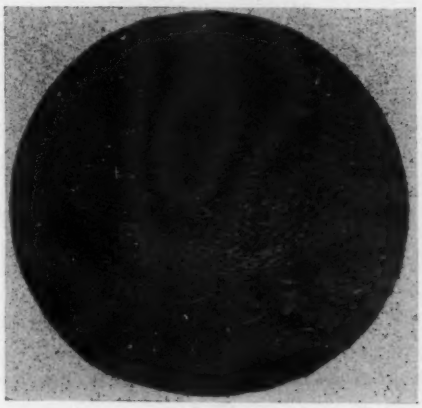

Fig. 1

Shows a tubercle-like granuloma made up largely of epithelioid cells and without a central focus of necrosis.

hyperplastic tuberculosis. Acid fast Gram-Weigert stain and MacCallum's stain reveal no fungi or bacteria. This lesion recurred and was removed *in toto*, one year later.

Microscopic Report (Dr. Cunningham).—Scattered granulomas, resembling tubercles and made of epithelioid cells are noted. There is an occasional foreign body type giant cell. There is no distinct central caseation, although in the center of many of the granulomas, there is some pink staining amorphous material, and in some places, there are needle-like defects, suggesting cholesterol crystals. No fungi are demonstrated. There are two needle-like structures found bordering giant cells, which show a definite index of refraction and have a distinct yellowish tint. These raise the question of impregnated foreign material.

Ziehl Neelsen stains for tuberculosis are negative.

McMillan's method of micro-chemical examination failed to demonstrate silica. However, in a personal communication, McMillan said that it was entirely possible that this material might have been present, in such small amounts as to defy detection. This is particularly true in view of the inert characteristics of silica. The diagnosis was nonspecific granuloma, post-traumatic. The Wassermann was negative; blood count, normal; Mantoux, negative; x-ray of chest normal, and x-ray of hands and fingers normal. Patient is normal today and has had no recurrence. Urine, normal.

Case 2.—Q. C. M., a man, received a blow and laceration on the center of the forehead in September 1943. There was a small indefinite mass in the center of forehead, the lower portion movable with definite epidermal thickening, suggesting a hematoma in previous scar tissue. This was removed surgically February 19, 1945. The subcutaneous tumor mass was dissected out and removed *in toto*. There was a gristly, hard, fairly well circumscribed tumor mass, about the size of the last joint of the little finger.

Pathological Report.—Section through the specimen shows striated muscle and fibrous tissue in which there are numerous tubercle-like granulomas, differing only in their apparent absence of central caseation. There are in this specimen, a few needle-shaped structures, simulating glass found in one of the granulomas. Around this material, are also found giant cells. With the light cut down, this material has a greenish cast. It is not found in every granuloma, but on careful search, it is found fairly diffusely spread throughout the tissue.

The microscopic diagnosis is nonspecific sarcoid-like lesion, following trauma. In x-ray of the skull, no pathology of bones of skull was seen. X-ray of the hands demonstrated no bone changes on fingers. X-ray of the chest showed no lesion suggestive of sarcoid. The Wassermann was negative, as was the general blood examination.

Case 3, 4, and *5.*—All were identical with the description and findings of Case 1. All were colored. There were one man and two women.

Case 6.—Mrs. A. T., age 68, a housewife, was rather thin, and her general health was fair. She had moderate secondary anemia. Two years previously, while picking roses, she was pricked by a thorn-bush behind the left ear. The area was slow to heal, yet in one month, was well. Three months later, a tiny nodule appeared over the site of the prick from the thorn; little attention was paid it, yet in 3 or 4 months a noticeable growth had occurred. At this time she was seen and biopsy advised.

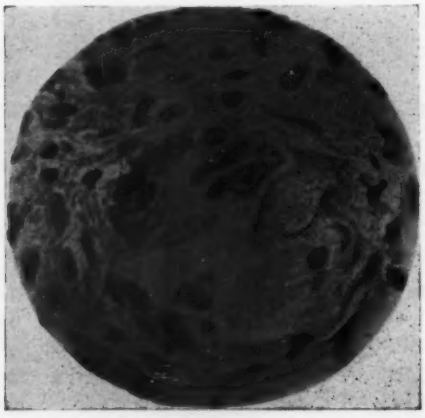

Fig. 2

A higher magnification of a giant cell in a similar granuloma showing the peculiar unidentifiable foreign material.

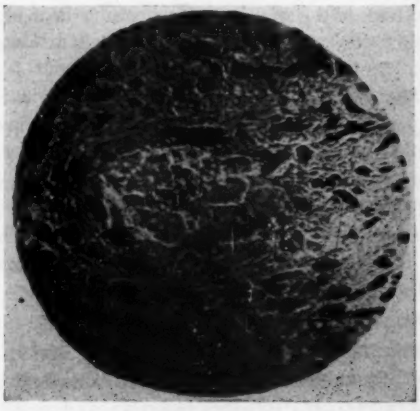

Fig. 3

Shows more of the same peculiar foreign material in a granuloma-like area.

Microscopic Description.—Throughout the whole depth of the corium, from the papillary layer to the limits of the subcutaneous tissue, sharply circumscribed foci of a new growth separated from each other. High power showed that the cells of the new growth were of the type of epithelioid connective tissue cells and that the tumor, as a rule, had its origin in the perivascular lymph spaces. The proliferated cells soon enclosed the greatly dilated vessels, with a compact cylindric mass. As proliferation increased and the foci took different shapes, though still sharply circumscribed, the resemblance to epithelioid cells became more marked. Nuclei were large and vesicular, less deeply stained, and showed distinct nucleoli, and sometimes multiple cell protoplasm was increased in amount and sent out prolongations in different directions. Lymphocytes were seen at the periphery, plasma cells and scattered giant cells. There was no evidence of caseation necrosis.

The Wassermann was negative, and blood examination negative except for a mild secondary anemia. Calcified areas were found in x-ray examination of the chest.

SUMMARY

(1) Six cases of skin disorders, which clinically answered all the descriptions of sarcoid have been reported.

(2) We were able to rule out tuberculosis in at least five of these and only a mere suggestion was noted in the sixth.

(3) All six cases had a definite history of trauma preceding the development of the lesions.

(4) No attempt has been made to disprove that tuberculosis is an etiological factor of sarcoid.

(5) Three patients had history of injuries in automobile accidents and a cut by glass in the area of later development of these lesions.

(6) These three, and *Case 1* showed unusual crystals in the section, which on inspection simulated silica or possibly cholesterol.

(7) These irritants, glass or cholesterol, have not been definitely identified. Further studies are being made in the attempt to classify this substance.

(8) None of these cases responded to arsenic internally.

(9) The classification of the etiology of sarcoid has been vague and this report has been made in the hope of stimulating further investigation and study.

THE USE OF THE BERMAN LOCATOR IN REMOVAL OF INTRA-OCULAR FOREIGN BODIES*

By BENNETT Y. ALVIS, M.D.
St. Louis, Missouri

The presence of an opaque foreign body within the eyeball and its location can be determined by means of the x-ray. The Sweet method of localization is sufficiently accurate in the great majority of cases to enable one to extract the foreign body if it is magnetic.

The ability to point out on the exposed sclera the exact spot under which the object lies, to determine whether it moves in response to the magnet and to follow its course forward at successive applications of the magnet greatly facilitates the operation. It also adds greatly to the comfort of the operator to know what progress is being made, if any. If the foreign body is being removed by the anterior route, it is helpful if its course can be followed forward. A needed change in the point of application of the magnet may be made if one can determine where the particle has been halted.

If trans-scleral removal is chosen, one may determine before making the incision whether the object can be drawn to a site of election in the so-called silent area between ciliary body and ora serrata 5.5 to 8 mm. behind the limbus. If the fragment is fixed to the sclera and does not move in response to the magnet, then the exact point for the incision can be pointed out, a minimal opening made and traumatizing exploration avoided.

The x-ray localization sometimes leaves one in doubt whether the foreign body lies just within or just without the globe.

Sherman,[5] in a personal communication, reports a case in which a small perforating wound and a hole in the iris were found after the patient had been struck in the eye by a fragment from a hammer. The x-ray examination revealed no foreign body. The locator was applied

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*From the Department of Ophthalmology, Washington University School of Medicine.

and indicated the presence of a magnetic foreign body 8 mm. posterior to the lower margin of the cornea. A thin flakelike particle 2 x 2 mm. was removed with the hand magnet through a scleral incision at the indicated position.

In our *Case 4*, the double exposure plate showed two shadows indicating movement of the object with the globe. The Sweet localization was just outside the sclera. At operation the "locator" showed definitely the presence of a magnetic body inside the sclera.

A young man suffered a double perforation of the right eyeball by a sizable fragment of ferrous metal which passed through the lateral aspect of the sclera from front to rear missing the ciliary body. It came to rest tight against the outside of the sclera between the equator and the macular area. Exploration and attempted removal by magnet were unsuccessful. The eye became quiet and remained *in situ* for several years subject to occasional mild inflammatory episodes. When finally the eye was removed, the metallic fragment was found indenting the sclera and adherent to it. It was my opinion that the early removal of this foreign body would have saved this globe. The Berman locator would undoubtedly have made the removal of this fragment easy of accomplishment.

Several other surgeons have found it advantageous to use the locator to supplement the x-ray examination. McDannald,[6] in a note to Mr. Berman, related his experience in a case in which the x-ray plotting showed the foreign body to be near the nerve head, 21 mm. back of the center of the cornea. He says that on five separate days unsuccessful attempts were made to bring this foreign body into the anterior chamber with the giant magnet. Following this, the sclera was exposed between the lateral and inferior rectus muscles where the tip of the giant magnet was applied without demonstrable reaction. The locator now showed the presence of the foreign body under the insertion of the inferior oblique. The magnet was applied in this area without visible results. The locator now showed the foreign body to be about 8 mm. from the limbus. The magnet applied at this point caused the sclera to lift. The foreign body was then removed through an incision at this site.

Bevans[7] details his experience in a case of failing vision in which no foreign body had been suspected in spite of the history of two accidents, four years and one year previously in either of which a foreign body might have entered the eye.[8] A corneal and iris lesion were found and the x-ray revealed a foreign body which was localized three different times with varying results. In view of these confusing reports the Berman locator was employed. Bevans says,

"First, it indicated the chip was magnetizable, and secondly, it revealed its presence to be at least 5 mm. from the nearest previously indicated locations . . . With the magnet, I found the chip . . . exactly under the incision . . . I feel certain I would have failed in my attempts at extraction but for the localizer."

Tharpe,[8] regarding the locator, says:

"It has done the following things for me: It has differentiated magnetic foreign bodies from non-magnetic. It has determined the presence of magnetic foreign bodies. It has pin-pointed the magnetic foreign bodies with such accuracy on the surface of the globe that the incision uncovered the foreign body directly making unnecessary the insertion of the tip of the magnet into the vitreous. It has provided a reassuring check of the x-ray localization where that was perfect and has provided unfailingly correct localization where the x-ray localization was faulty . . . The locator has enabled me to follow the movement of a foreign body at such times when I considered it desirable to move it from a posterior position to a more favorable site for surgical approach . . . I found the locator to be an excellent guide in determining the choice of magnet. A weak locator response indicates the necessity for the giant magnet while a strong response indicates the hand magnet should be tried first."

It is not the purpose of this essay to discuss the general subject of intra-ocular foreign bodies. The very extensive literature on this subject has brought out several points worth mentioning as having a bearing on the time and method of procedure.

It has been shown that generally results are as good if the foreign body is removed after some time has elapsed. Therefore one may delay long enough to have careful x-ray localization made and to make several attempts at removal if unsuccessful at the first trial.

Most surgeons believe that removal by the anterior route does less damage to the eye and results in a better percentage of vision saved.

It is my belief that if the size, shape and location of the foreign body are such that it can be drawn into the anterior chamber without further damage to the lens and ciliary body, it is desirable to do so.

If the trans-scleral operation is chosen, the opening should be made in that zone which lies behind the ciliary body and in front of the ora serrata; that is, from 5 to 8 mm. behind the limbus provided the foreign body can be drawn to this area.

When the trans-scleral operation is done, the area about the incision should be treated with diathermy and the scleral wound closed by suture as prophylaxis against retinal detachment.

The outlook in cases of foreign body in the vitreous is none too good. Some authors (Philps[3]) report loss of the eye in half the cases, while others claim 80 to 90 per cent retaining good vision. The conclusions of Zukrzhevskaya[4] probably give a fair overall view of the subject.

"The results depend on the size of the foreign body, the site of the injury, the presence of complications and the precision of the surgical technic." . . . "—immediate operative intervention is not essential to good results."

It is generally held to be a great advantage.

Of the seven cases reported here, only one retained normal vision. Three others will probably have useful eyes when the cataracts are removed, while the other three will have useless eyes even if the globe is retained. Yet in every case save *Case 1* the operation was executed with minimum trauma and the site of the incision chosen most accurately.

The Berman locator, briefly speaking, is an instrument that gives a signal when the point of the finder is near a magnetic object.

The instrument was devised by Mr. Samuel Berman of the electrical engineering department of the New York City Transit System for Dr. John J. Moorhead who recognized the need for an operating room instrument to supplement x-ray localization of imbedded foreign bodies which often prove elusive and difficult to find however accurate the radiographic localization may be. Moorhead described the specifications for such an instrument in the following paragraph.

"Such a 'diviner' should locate the object accurately prior to the operative exposure and be equally effective in determining the depth in the wound. It should give visible response on the indicator and become activated by fragments of iron, steel, copper, silver, aluminum, lead or their combinations. The electrical source should be the ordinary plug-in type or come from a storage battery or dry cells."

The perfected instrument resembles a portable radio with dial and control knobs regulating the sensitivity of the apparatus. Present models incorporate an audible tone signal which varies in intensity as the probe point approaches and recedes from the magnetic foreign body (*Fig. 1*).

The probe or finder is the size and shape of a large fountain pen with a cylindrical handle fitted with a sterilizable rubber sleeve for handling and searching in the operative field.

Minsky[9] says:

"The locator operates in the following way: In a diagnostic rod is placed the equivalent of two transformers, one in the handle and the other at the tip which is used to search for the foreign body. The primary coils are connected in series to a source of alternating current. Also in series, the secondary coils are connected through an amplifying unit to a voltmeter where current is produced in the secondary coils by induction. The instrument has a means of equalizing (balancing out) the voltages in the secondary coils so that the needle of the voltmeter will read approximately zero since no current flows.

"Now if the coil in the tip of the rod approaches magnetic metal, the balanced inductance is disturbed and a difference in potential takes place in the secondary circuit which results in a flow of current. The differentiation of a non-magnetic from a magnetic foreign body is easily made."

Regarding the detection of foreign bodies of various sizes and compositions, the following paragraph from a bulletin by Mr. Berman says:

"The distance from which a magnetic foreign body will be detected depends upon its size and its composition. Soft iron and ordinary 'carbon' steel are the most responsive. Alloy steels such as ball bearing steel and 'high speed' tool steel are less responsive. Certain stainless steel alloys are entirely non-magnetic and will give no response.

"The following distances apply to common iron or carbon steel.

Dia. of Mass	Approximate distance of detection from bare element (shield removed)
1/4 mm.	2-1/2 mm.
1 mm.	10 mm.
3 mm.	30 mm.
Common steel needle	1-1/2 to 2 inches
3-inch iron nail	4 inches

"The sensitivity of the locator to non-magnetic metals (copper, brass, aluminum, lead, and so on) is relatively low and not always helpful. However, when a foreign body has been approached closely enough to be within detecting range of the probe and yet cannot be found, the locator can be most useful.

"The following distances apply to non-magnetic metals:

0.45 caliber lead bullet	3/4 inch
0.22 caliber lead bullet	1/8 inch
copper one-cent piece	1 inch"

CASE REPORTS

Case 1.—Mrs. R. A., age 53, suffered an injury to the left eye while striking a fence staple with a hammer.

The x-ray localization showed a foreign body 3 x 2 x 2 mm., 23 mm. posterior, 7 mm. nasal and 3 mm. below the corneal center.

Operation No. 1.—After prolonged futile attempts to draw the foreign body forward with the magnet, a linear extraction of the lens was performed through a keratome incision above. A long O'Connor muscle hook was then passed through the wound and backward into the vitreous chamber toward the supposed position of the foreign body to a depth of 10 mm. and the magnet point applied to the bend of the hook repeatedly but the particle was not recovered. The wound was closed. A Kuhnt flap covered the keratome incision and the re-opened corneal wound of entrance.

The postoperative period was characterized by considerable reaction and persistent pain for a week.

A second operation was imperative either for removal of the foreign body or the enucleation of the globe and was undertaken one week later under "pentothal" sodium anesthesia.

The external rectus muscle was reflected and the

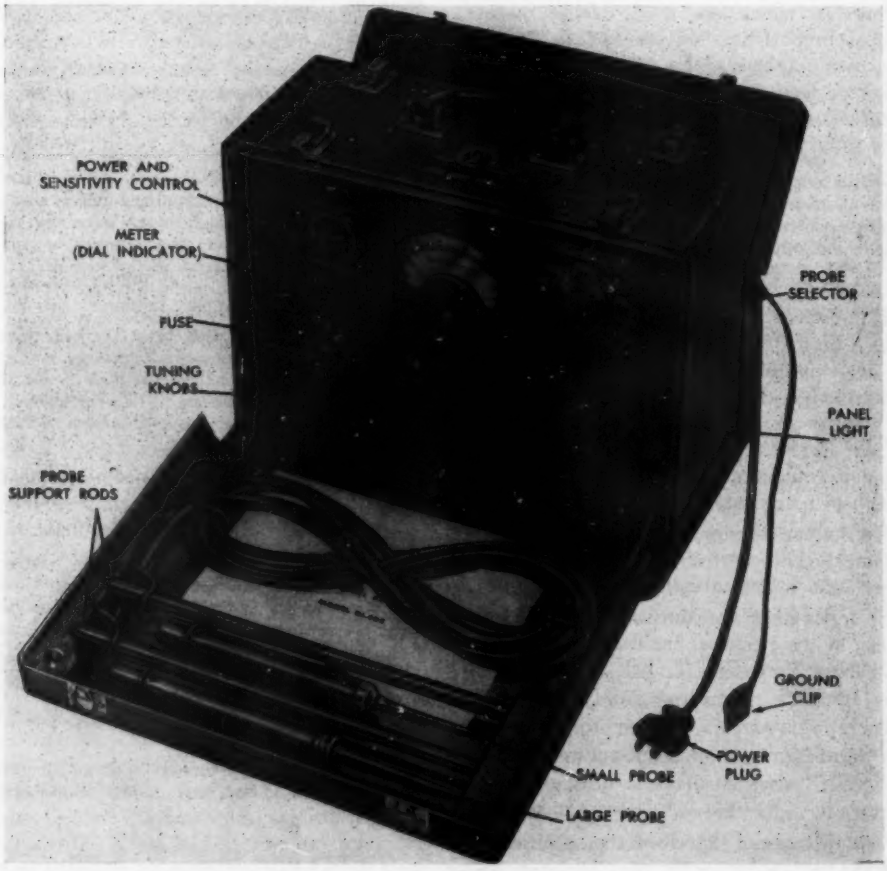

Fig. 1
The Berman Locator.

eyeball rotated as far nasally as possible. The Berman locator tip applied to the sclera gave its most intense signal at a point almost at the posterior pole. The tip of the magnet was applied to the sclera 5 mm. anterior to this point. After turning on current, the magnet was moved forward toward the equator. This maneuver was repeated several times. The locator was again applied and the loudest signal obtained when the point was over the sclera posterior to the equator. The magnet was applied just back of the ciliary region and drawn toward the cornea. The locator now indicated the presence of the foreign body just behind the ciliary body.

The magnet was then applied to the cornea on the opposite side and moved toward the keratome incision. After a few attempts the jagged foreign body presented in the wound and was removed along with some shreds of iris.

Case 2.—Mr. A. B., age 50, was injured June 22, 1945, by a fragment from a hammer striking a chisel. Cornea and iris wounds were found at the 12 o'clock position. The lens was partially opaque. The x-ray localization showed an opaque body 1 x 2 x 1 mm., 10 mm. behind and 13 mm. below the center of the cornea.

The locator indicated a point 5 mm. below the limbus in the 6 o'clock meridian as nearest the foreign body.

Repeated attempts to draw the particle forward with the magnet were made but its position as indicated by the locator remained unchanged. A 3 mm. meridional incision was made in the sclera at this point, 5 mm. below the limbus. The foreign body adhered at once to the magnet tip applied to the incision.

The scleral wound was closed with a previously placed silk suture, and diathermy punctures were placed in the sclera around the wound.

The postoperative course was quiet.

Case 3.—Mr. H. C., age 30, was struck in the left eye July 9, 1945, by a chip from a hammer. There was a small wound of entrance in the sclera 2½ mm. from the limbus near the horizontal meridian. A small amount of blood was in the anterior chamber. The cornea and lens were clear; the vitreous slightly hazy.

The foreign body could be seen imbedded in a chorioidal wound 30 degrees above the horizontal plane and was localized according to Stine's table at a point 12 mm. back of the limbus.

X-ray localization showed a 2 x 1 x 1 mm. foreign body 14 mm. back, 7 mm. above and 8 mm. temporally. When measured with calipers, this pointed to almost the exact spot laid out by the ophthalmoscope and perimeter calculation. The Berman locator indicated the presence of a magnetic object at the same point.

Since the retina and choroid were already perforated, it was thought best to do a diascleral extraction. A radial incision through the sclera was made at the point indicated and the steel fragment presented immediately. Diathermy points were applied around the opening which was closed with a silk suture.

The uneventful recovery was complete. The patient was kept in bed for ten days as the retina showed slight elevation, after which the vision was normal and the retina in place.

Case 4.—Mr. A. P., age 38, was struck by a particle from a hammer which entered the left eye. The vision was obscured at once. There was a wound of entrance in the cornea near the center and in the iris at the limbus. The lens was opaque. Very slight redness was present but no flare or cells were seen.

The x-ray localization indicated a foreign body 7 mm. below, 10 mm. nasally and 25 mm. back of the center of the cornea. This point is outside the sclera. The double exposure plate showed two shadows indicating movement of the foreign body with the globe.

At operation, July 13, 1945, the Berman locator failed to give any signal when the point was applied to the intact eye.

The sclera was exposed in the lower nasal quadrant and the globe was rotated up and laterally by scleral stay suture at the limbus. The locator indicated a point near the 45 degree meridian about 15 to 17 mm. from the limbus, that is, 2 to 4 mm. behind the equator as being nearest the foreign body. The magnet was applied and the particle drawn forward to a point 5 mm. from the limbus, where it was removed through a scleral incision.

Case 5.—Mrs. A. C., age 27, had a particle from a hammer enter the left eye August 28, 1945. The vision was only slightly impaired at first. Examination, August 31, 1945, revealed a tiny scar in the cornea in the upper central pupillary area and a posterior lens opacity, shaped like a maple leaf. The fundus was visible.

The x-ray showed a 1 x 1 x 0.5 mm. particle 21 mm. back, 7 mm. below and 4 mm. temporal to the center of the cornea.

The sclera was exposed and the globe rotated upward and nasally. The Berman locator pointed to a spot on the sclera 21 mm. from the limbus on the 4:30 meridian. Persistent attempts to move the foreign body forward by repeated applications of the magnet were unsuccessful. The locator indicated the foreign body to be at the same spot throughout.

Finally a meridional incision was made through the sclera 12 to 16 mm. from the limbus. The foreign body adhered to the magnet point applied to this wound. A bead of vitreous escaped and with it a gray plastic capsule which presumably had surrounded the particle and prevented its being moved forward by the magnet. Ten micro-pins were placed surrounding the incision.

After one week bedrest, the retina seemed edematous, elevated 7 D. The lens opacity was unchanged and the vision 6/10 with correction. Two weeks later the retina was flat, the lens opacity and vision unchanged.

Case 6.—Mr. A. G., age 35, was injured September 16, 1945, by a chip from a hammer striking a hatchet. Immediate reduction of the vision to light perception occurred.

Examination 12 hours later revealed a punctured wound at the 3 o'clock position extending from the limbus 4 mm. into the sclera, some clotted blood in the anterior chamber, a pupil of 6 mm., no red reflex but blood visible in the vitreous chamber. The vision was reduced to bare perception of bright focal light.

The x-ray localization showed a fragment 4 x 2 x 1.5 mm., 12 mm. back and 10 mm. temporal to the center of the cornea in the horizontal plane.

The Berman locator indicated a point 8 mm. back of the limbus in the 9 o'clock meridian.

Because of the large size of the foreign body, and the fact that the wound tract traversed the ciliary region, it was thought withdrawal along that path would incite further bleeding. An incision was made through the sclera at the site indicated by the locator. The jagged chip of steel emerged the instant the magnet was applied. The wound was closed with a 6-0 silk suture and surrounded by diathermy punctures.

Two weeks later the eye was still rather red and photophobic. The tactile tension was normal, and the slit lamp showed no k.p. but moderate aqueous flare. Enucleation may be necessary if the eye does not become quiet soon.

Case 7.—Patient of Dr. H. R. Hildreth who kindly furnished these data.

Mr. O. K. was struck in the right eye August 27, 1945, by a fragment from a hammer and chisel. His safety glass was shattered and a perforating wound made in the sclera nasally 6 mm. from the limbus.

The cornea, aqueous and lens were clear, the vitreous filled with blood. A glittering foreign body was visible behind the upper temporal aspect of the lens. The x-ray localization placed a 4 x 4 x 5 mm. foreign body 21 mm. behind, 4 mm. below and 12 mm. nasally, a position well without the globe.

Operation was performed October 5, 1945, after 6 weeks observation.

Through the conjunctiva an opening 2½ cm. deep was made between the medial rectus and the orbital wall. The tip of the Berman locator was introduced into this opening and signalled the presence of a magnetic foreign body directly posterior to the dissection.

The muscle was freed from the globe which was then rotated outward. No change occurred in the intensity of the signal as the globe was rotated, indicating the absence of any magnetic foreign body within the eyeball. The locator responded to light lateral pressure and could not be used successfully to explore the depth of the narrow opening in the orbital tissues. The foreign body was therefore permitted to remain.

The foreign body within the globe was shown by the locator to be non-magnetic and did not cast any shadow on the x-ray plate. It is probably a fragment of the safety glass.

COMMENT

In each of these cases a different problem was presented and the solution was aided by the locator in a somewhat different way.

In *Case 1* a foreign body in the depth of the vitreous chamber was drawn forward step by step under guidance of the locator to exit through a limbal wound.

In *Case 2* the foreign body was in the anterior third of the globe near the sclera and should have followed the magnet forward into the anterior chamber. The locator showed its persistence in the original site and the necessity of diascleral removal as well as the exact point for the scleral incision.

Case 3 is chiefly of interest in showing how nearly the three methods of localization agreed, the Sweet method and the ophthalmoscope-perimeter method pointing to almost the same spot as the locator.

In *Case 4* the x-ray localized the foreign body as probably without the globe. The locator showed it definitely to lie within the globe. Furthermore, after the magnet had drawn it forward from the depth of the vitreous to a position well forward of the equator where it lodged, the locator pointed out the new position and enabled one to make the scleral opening in a favorable place.

In *Case 5* the particle was encapsulated and could not be moved by the magnet. The locator pointed out the exact position on the sclera for the incision, as well as showing the immobility of the foreign body. This tiny chip could easily have been missed.

Case 6 would have been handled the same way without the locator. It was comforting to know the incision was being made just where the foreign body lay.

In *Case 7* two useful points of information were corroborated, the exact extra-ocular location of the magnetic object and the non-magnetic nature of the intra-ocular one.

It was necessary in all cases to bring the tip of the locator within a few millimeters of small particles in order to get a signal. This generally necessitated exposing the sclera and rotating the globe.

CONCLUSION

The Berman locator is a valuable aid in the operative removal of magnetic intra-ocular for-

eign bodies in that it affords definite information as to the position of the particle at all stages of the operation.

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DISCUSSION (*Abstract*)

Dr. George M. Haik, New Orleans, La.—I am in complete agreement with Dr. Alvis as to the importance of accurate localization of foreign bodies in the eye. Accurate localization is the basis of successful removal of foreign particles, and therefore the basis of preservation of structure and function.

Unfortunately, however, at least in war, while methods of localization based on magnetic principles are becoming more accurate, their usefulness is being lessened by the steady increase of non-magnetic foreign bodies.

Minsky, in an interesting review of the subject, pointed out that Aveling in 1851 used the principles of magnetism to locate a needle in the soft tissues. In 1880, Pooley, and in 1881 Pagenstecher, working independently, first applied the method to intra-ocular foreign bodies.

The Berman locator really derives from those first crude efforts. At the 64th General Hospital, which was the Ophthalmic Center for a designated area of Italy, we used in the last months of the war a locator devised by Lt. Col. Henry Carney, of Boston, on the principle of the Berman locator, though his work was independent.

In some cases we found it useful as an adjunct to other methods, but in the last four cases in which we employed it, it was of no help whatsoever. We had failed to remove the foreign particles in these cases by the magnet, and their lack of magnetism was obviously the reason for the failure of a method based on magnetic principles.

The Berman and Carney locators are of undoubted value in the localization of magnetic foreign bodies, particularly those which lie superficially, but a negative response must not be assumed to indicate that no foreign particle is present.

In our large experience with intra-ocular foreign bodies at the Ophthalmic Center of the 64th General Hospital, we placed our greatest reliance upon roentgenologic methods. Postero-anterior and lateral films were made and quickly read. Localization was then carried out by two methods:

(1) After the silver ring had been placed in the cul de sac, double exposures were made on the same film, first with the patient looking up and then down, and second, with the patient looking to the right and then to the left.

(2) An accurate localization was done by the Sweet method. In some cases small lead beads were sutured about the limbus in different positions as an aid to localization, and to avoid using a contact lens, which is undesirable from the standpoint of trauma and in my opinion not particularly accurate. If the foreign body lay just outside the sclera, air was injected into Tenon's capsule. Our experience with fluoroscopy was disappointing.

The roentgenologic methods we employed were, as you will note, more or less routine. Our technic, however, was precise and exacting. Special cassettes were reserved for eye work and were kept scrupulously clean. Exposures were rapid. All distracting movements and noises were avoided, and the patient's cooperation was deliberately sought.

Films were read while the patient was still in the department and were repeated at once if they were unsatisfactory. Technicians were trained for this special work and worked with great care. Their genuine interest in what they were doing was perhaps increased by the fact that they knew the work would have to be done over again if there were discrepancies between the various films. Finally, we had the great good fortune to work with an interested roentgenologic staff, between whom and ourselves cooperation was complete.

Our results, naturally, were affected by the circumstances of war which, as a rule, caused far more devastating wounds than one sees in civil practice. Such successes as we achieved were unquestionably due, as successes in such cases always are, to accurate localization of the position of the foreign body before removal was attempted. Good exposure and sound technic are of little value unless that requirement is met, and efforts at greater accuracy of localization should be encouraged and continued.

Dr. V. R. Hurst, Longview, Texas.—After hearing Dr. Alvis' paper, I will surely review my technic on locating intra-ocular foreign bodies with the Berman locator. We have used one for the last year with more or less success and have about reached the conclusion that it has practical value to the otolaryngologist and the general surgeon, rather than to the ophthalmologist.

As Dr. Alvis has pointed out, small foreign bodies which are lying against the posterior pole are the difficult ones. Our experience with some of these cases has been disappointing since we were not able to get a response with the locator.

In the field of otolaryngology where the foreign body penetrates the neck in the area of the large blood vessels or with broken needle in tonsil surgery, the Berman locator is of marked value since the test can be made after the incision without undue trauma to the surrounding tissues. In these cases, the foreign bodies are usually larger and are easily located.

The problem of the exact localization of foreign bodies is frequently a difficult one and we are glad to have this newer method which will help to solve it.

Dr. Alvis (closing).—Dr. E. B. Alvis, who was working in the 21st General Hospital in Italy, reported fifty-four cases of intra-ocular foreign bodies which he removed without the aid of the Berman locator. However, since he came home he has had the opportunity of working on one or two of these cases with the Berman locator. His reaction was that although the x-ray was indispensable, the Berman locator itself was a great aid at the operation.

Dr. Hurst mentioned the fact that small foreign bodies do not give a very marked response. The Waugh Laboratories have prepared a table which I have incorporated in this article, indicating the distances at which response can be had from particles of various sizes. For instance, a particle one millimeter in diameter must approach very close to the tip of the locator to give a signal, while a particle four or five millimeters in diameter will give a response much farther away.

However, my own experience has been that this locator used during operation was a great comfort even though we had x-ray localizations in every case. It enabled me to remove two or three foreign bodies which I probably would have missed, or at least, if I had not missed them I would have traumatized the eye much more severely to get them out than I did by the use of the locator.

RECENT SIGNIFICANT TRENDS IN THE CARE OF CEREBRAL PALSY*

By WINTHROP M. PHELPS, M.D.
Baltimore, Maryland

(1) NUMBER AND DISTRIBUTION OF CASES

It seems quite definite at the present time that cerebral palsy constitutes the largest group of neuro-muscular crippling conditions. This statement is open to question only in relation to the frequency of poliomyelitis. But poliomyelitis is an epidemic disease and extremely variable in its incidence. There is no doubt that in certain years and certain localities it far exceeds cerebral palsy in number of cases and that the grand total for the country also varies from year to year. No other causes approach either of the conditions in frequency.

On the basis of statistics, gathered through the last twenty years in various parts of the country, in both urban and rural areas, it has been found that in every 100,000 population there are seven cases of cerebral palsy born each year. Of these, one dies in infancy, or at least under six years of age, so that the real frequency for normal life expectancy is of six new cases each year in every 100,000 of population. This number (6 per 100,000 per year) is a constant, and is the same in the mountains of West Virginia or Kentucky as it is in New York City or Detroit, for example. Of these six, two, or one-third, are definitely feebleminded and will require permanent custodial care for life. These two, therefore, can be excluded from the treatable group in general.

Hence, the real case load for treatment is four per 100,000 population born each year. It is possible further to subdivide these four mentally normal cases into: one case, severely handicapped, homebound and essentially hopeless from the point of view of physical rehabilitation (although mentally normal) because of the very marked degree of handicap; two cases moderately handicapped and capable of great improvement, occasionally practically complete restoration of function; and the fourth case, so mild that any prolonged degree of treatment is unnecessary.

The chief problem is then, of the two moderately handicapped mentally normal cases, born each year in every 100,000 of population. The life expectancy in these is essentially that of normal individuals so that the number of cases in this category in the country can be definitely stated. Thus, under 20 years of age, there would be 2 times 20 or forty cases in each 100,000 population, or 400 cases in each million, or 400 times 140 or 56,000 in the United States who are mentally normal, and who have handicaps of moderate degree and are thus capable of sufficient physical rehabilitation to take a definite place in the social and economic world.

The total number of cerebral palsy cases in the United States based on a life expectancy of 40 years, and including the mentally defective cases, homebound, severely handicapped, and the very mild cases would be

6 times (per year per 100,000)
10 times (per million per year)
140 times (per 140,000 per year)
40 (for 40 years life)
= 336,000 up to 40 years of age.

*Chairman's Address, Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

From the foregoing discussion it can be seen that the 56,000 under 20 years of age, constitute the ones which can be best worked with. This case load is at present entirely predictable and, unlike poliomyelitis, plans can be formulated for their care and physical and mental training, knowing that there will be little or no variation from this number. Every community can predetermine its requirements for care with a high degree of mathematical certainty. Thus, any town or community of 100,000 would have two (per year) times 20 (years), or 40 mentally normal highly treatable cases under 21 years of age at all times.

Furthermore, Odoroff[1] has determined statistically, that cerebral palsy is distributed among the various economic levels in direct proportion to the economic percentages in the population as a whole. Thus one can predetermine not only number of cases, per cent of mental deficiency, and treatability but also economic status in setting up treatment facilities and costs to the families and public with a high degree of accuracy. This predictable nature of the condition should facilitate plans markedly.

(2) PARTICIPATING AGENCIES

At the present time, care of cerebral palsy is woefully inadequate everywhere. This is not surprising since it is only recently that the ground work of surveys, classification, mental testing, physical diagnoses and other preliminaries have been on a sufficiently large scale to know what the problem is. It can be stated unequivocally that it is time now to proceed with the second step, namely: the setting up of proper facilities throughout the country for this care and training.

Such care as there is, is being inaugurated through four different types of agencies. The Crippled Children's Division of the Children's Bureau in the United States Department of Labor, is approving state plans for cerebral palsy programs in an increasing number of states and matching money through Social Security for these plans.

The state agencies, through appropriation by their legislatures, are setting up plans, sometimes through their departments of health or welfare or through their departments of education, or in some instances through direct crippled children's commissions. Some of the states which have definite state plans, include New Jersey, which was the first, Pennsylvania, Maryland, Illinois, and more recently California and North Carolina. Of course, many states are now treating cerebral palsy as a part of their total crippled children's programs, but these mentioned are among those which have special cerebral palsy programs.

Private agencies also are taking a definite step in plans for treatment of these cases. The National Society for Crippled Children and Adults is formulating plans and the local state organizations such as the Ohio Society for Crippled Children and the Maryland League for Crippled Children have well formulated cerebral palsy plans for care. In this group also throughout the country are found isolated individual instances of projects for cerebral palsy set up by organizations such as the Elks, Rotary Clubs, Junior League and many others.

The fourth group consists of the schools or institutions for cerebral palsy which are self-supporting and which may or may not have state or other independent aid.

(3) INDICATIONS FOR REHABILITATION

From all of the types of care which have been given thus far, definite indications of what is needed for these cases have been developed. These can be briefly recapitulated. The six cases each year in every 100,000 of population are classified as follows:

Total cases 7 per year
- 1 dies under 6 years old

6 permanent case load
- 2 feebleminded

Mentally normal 4
- (1 very severe, homebound — needs custodial care and education
- (2 moderate, treatable—need treatment and education
- (1 very mild, no treatment necessary

Of the group of four mentally normal cases (per year in every 100,000 population) one is severe and home or institution bound. This case, although mentally normal, is too severe ever to be made capable of self-help or self-support and needs custodial care and education because of his normal mind. There are no proper facilities for these cases at present. It

is very difficult to say what becomes of many of them. Probably most of them continue to be cared for by relatives or are wrongly placed in institutions for the feebleminded. They do not represent a problem for rehabilitation, but only for custodial care, but should have opportunities for mental development since this is the only field in which they can attain happiness or security.

The second group, the two of moderate degree, should have everything that can possibly be provided for them both in physical restoration and mental education. These two fields should be parallel, because of the very close relationship between mental and physical development. For these, there should be both boarding schools and day schools where mental and physical restoration can be carried out together to attain the best results. Often a year or two in a boarding school will bring about sufficient improvement to allow transfer to day schools, with the child living at home. Recent results of such plans have shown that if this course can be followed out, it is unnecessary to provide special treatment facilities at high school age, since such a decided degree of improvement can be made before that time, that these children are then capable of attending normal high schools without difficulty.

The fourth child in this group of four, is the very mild case, exemplified by the spastic hemiplegia, for example. His treatment may require surgery or a brace and perhaps simple exercises which can easily be carried out at home. He is capable of attending a regular school and presents almost no problem.

(4) ADVANCES IN KNOWLEDGE OF ETIOLOGY

Thus far, general planning and care have been considered. There have been, in the last twenty-five years, marked advances in the knowledge, classification and diagnosis of the conditions included as cerebral palsy. It should be pointed out at this point that the various etiologies are quite clearly defined and that the condition is for the most part unavoidable, at least in the light of present medical knowledge.

In order to show why a decrease in the frequency of cerebral palsy in the near future is unlikely, the etiology must be considered. This can be divided into three chronological periods: (1) prenatal, (2) natal and (3) postnatal.

(a) *Normal Variations in Structure and Function.*—Prenatal conditions comprise chiefly, congenital normal variations. Just as normal variations occur in the shape and size of noses, ears, hands, etc., of normal individuals, so also variations occur in the size, shape, and thus function of the various parts of the brain. These result in variations in function, if extreme, (and wherever there are possibilities of variation there are always extremes.) Dependent on the localization of these variations will be peripheral variations in function.

(b) *Congenital Defective Development.*—There is congenital defective development, an interference with the normal development of the brain, at any stage of pregnancy, independent of heredity or specific prenatal environmental influences. Unexplained interference with infolding of the various anlage do occur, and would doubtless result in abnormalities of function.

(c) *Pathological Prenatal Conditions.*—Of course, there are prenatal conditions which are definitely pathological such as vitamin deficiencies in the mother, brought on by the added requirements of pregnancy; calcium and other mineral deficiencies; glandular disturbances, kidney, liver and other diseases and infections, blood pressure changes, eclampsia, syphilis, and so on, which would undoubtedly be detrimental to the child, but in the most careful surveys, these disturbances can account for only a very small per cent of the total.

(d) *Birth Trauma.*—The conditions which occur at or around the time of birth are also very definitely understood and can be classified as follows:

(*a*) Prematurity with rapid birth. The pressure on the child during the contractions of the uterus during labor, followed by the sudden reduction of pressure to air pressure after birth, may result in rupture with hemorrhage of the vessels of the brain, not fully developed because of prematurity.

(*b*) Forceps delivery with pressure on the skull and subdural hemorrhage.

(*c*) Undue traction on instruments, resulting

in stretching of the neck and rupture of the vein of Galen.

(*d*) Anoxemia resulting in cerebral anoxia.

(*e*) Interference with venous return, for example, cord around the neck, resulting in multiple petechial hemorrhages.

(*f*) Rh negative mothers with Rh positive babies, with erythroblastosis (not responsible for more than 5 per cent of the cerebral palsies.)

(*g*) Abnormal flexion or extension of head resulting in displacement or fracture of the odontoid resulting in high cord injury.

(*h*) Excessive "twilight sleep" drugs resulting in anoxemia.

There are other less frequent birth injuries, but it is interesting to note that in a statistical study it was impossible to blame "poor obstetrics" for more than three per cent of the birth injured cerebral palsies.

(e) *Post-Natal Conditions.*—The post-natal causes of cerebral palsy are many. The most common of these are:

(*a*) Convulsions due to extraneous causes such as constipation, fever, etc.—resulting in cerebral hemorrhage during the first three months of life.

(*b*) Pertussis (whooping cough) under six months of age.

(*c*) Encephalitis.

(*d*) Head trauma (falls, automobile accident, etc.)

(*e*) In the adults, cerebral accidents, any cause.

These etiological factors have been reviewed briefly to show chiefly one thing; that is, why the statistical analysis is constant. Coupled with this is the fact mentioned before, that the proportion is the same among the rich as among the poor. This would suggest that, while by etiological research and better control it might be possible to reduce the percentage somewhat, this attack on the problem would not greatly change the picture in the light of our present knowledge.

(5) ADVANCES IN DIFFERENTIAL DIAGNOSIS IN RELATION TO INDICATIONS FOR TREATMENT

As the result of the many surveys that have been made and the consequent opportunity to see cerebral palsied children in large numbers, it has been possible to classify them and determine the reconstructive procedures that are most effective in the different types. At first, all of these children were considered spastics and, as described by Little in 1862, hopeless idiots that should be put away and forgotten.

(a) *Indications and Contra-indications for Surgery.*—In relation to treatment, consider surgery. Surgery was for the most part developed with poliomyelitis in mind, and the various procedures adapted to the so-called spastic, without the realization that the condition was totally unrelated. There was no reason why surgery, evolved for one condition should be effective in another. However, because of the complete absence of any literature on surgery in cerebral palsy, the orthopedic surgeons had to utilize what they knew best and apply it with the hope of success. It is interesting here to note that they had success, when they were dealing with true spastics, but that the majority of cerebral palsies were not spastics and all of these accounted for their failures.

There are six types of motor impairment found in cerebral palsy. The most frequent type of cerebral palsy actually is athetosis. In this type, surgery fails. This is because athetosis fundamentally is an attempt on the part of the patient (entirely unconsciously) to get the given extremity into a certain distorted position, and he attempts this with any muscles which may accomplish it. Thus, for example, if it is an attempt to get the foot into an intoeing position, he can do it either with the tibials and motion through the midtarsal joint, or by rotating the whole leg inwards from the hip. If one motion is prevented, for example, by bony stabilization of the midtarsal joint, the leg will subsequently be rotated in from the hip to accomplish the intoeing position. This fact about athetosis has been borne out in many cases.

Many cases of athetosis show tension and this is developed early in an effort to fight the athetosis. This tension is often mistaken for spasticity and patients are operated upon with resultant failure. It is difficult to distinguish many tension athetoids from spastics, but if operation is contemplated, the best test in case of doubt is to apply a brace or other external fixation which will produce approximately the

same result as operation for a few weeks, and then determine whether the proposed operation will be of benefit or not. The brace can be removed if results are not good, but the operation is irreversible.

Second to the athetoids, the true spastics are the most common type of cerebral palsy. True spasticity is a definite muscle condition, characterized mainly by the presence of the stretch reflex. The stretch reflex is the contraction of a muscle when it is stretched either passively or by active contraction of its antagonist. This contraction, resulting from stretching, of course interferes with free motion and the reciprocal action in joint function. This condition is highly susceptible to many types of orthopedic operation, muscle transplantation, neurectomy, joint stabilization, and so on, and the results of such surgery are highly gratifying. However, it is very important to elicit a definite stretch reflex in order to make a diagnosis of spasticity because it is too easily mistaken for athetosis with tension.

Rigidity is another condition found in the muscles of cerebral palsy and this condition results in difficulty of motion because of loss of elasticity and a "lead pipe" type of response to bending. Obviously, this would not result in success in the types of operation used in true spasticity.

In the spastic, there are often flaccid muscles and sometimes the "scissors gait," for example, is not due to spasticity of the adductors, but to flaccidity of the abductors, in which case, naturally, adductor tenotomies or obturator neurectomies would result only in flaccidity both in abduction and adduction and a worse handicap than before. In all cases of true spastic paralysis, therefore, it is important first to determine the presence of true stretch reflex in the muscles under consideration, and second to determine the amount of power in their antagonists.

Rigidity, which has been mentioned, is a third type of cerebral palsy and is due to two chief causes: one, multiple petechial hemorrhages from back venous pressure, (cord around the neck for example) or from anoxemia with consequent cerebral anoxia from prolonged asphyxia. The outlook for these cases is very poor as there is a high percentage of feeblemindedness in them. However, it must be borne in mind that there are always exceptions in this group.

The types of involvement so far discussed have been athetosis, spasticity, flaccidity (as a component in spastic patients) and rigidity. The other two types are tremors, (usually seen in acquired cerebral palsy such as paralysis agitans), and ataxia.

Ataxia is, strictly speaking, usually a cerebellar palsy although there is ataxia present as a secondary manifestation in the other forms of cerebral palsy. Primary incoordination can be due to cerebellar lesions and also to eighth (cranial) nerve involvement. This condition is highly susceptible to balance training and re-educational procedures and there is usually no indication for surgery or other special measures. The ataxic child constitutes a very individual problem of education of which time does not permit discussion here.

This division of cerebral palsy into special types is of great importance in effective treatment and is resulting in the reclamation of an increasingly large number of these patients.

(b) *Use of Drugs.*—Recently, within the past 2-3 years advances have been made in drug therapy which is suggestive. It has long been known that hyoscine, and its related drugs, have been effective in many of the motor manifestations of the post-encephalitic dystonias. Its effectiveness appears to be in the restoration of previously learned automatic functions. Obviously, no drug will restore functions which have not been previously learned. The successes with the hyoscine group are to a large extent due to the fact that encephalitis is an acquired disease, usually after walking, speech and arm coordination have been learned, and the drug facilitates the ease of performance of these functions.

The child handicapped from birth has never had the opportunity to learn these functions, so that even when hyoscine is effective, he will still have to be taught by means of physical re-educational methods to perform these automatic functions. They are taught through the specific fields of physiotherapy, occupational therapy, and speech therapy. The whole attitude of the therapists must of course be dif-

ferent from that used in restoration of previously learned functions, for example: such as are found in poliomyelitis or amputations. The concept of reciprocation of the two legs in walking is present in poliomyelitis even with a high degree of involvement, and the relearning to walk is merely an adaptation of the remaining power to this automatic function. But if this original function is not developed, walking will not take place even if good muscle power can be developed. This fact is just as true of surgical operations as of drugs.

There are several other drugs which show promising and definitely helpful action, if the facts stated above are kept in mind. These of course do not work equally well for all the different types of cerebral palsy since, as was explained, the muscle involvement is so diverse.

Of these drugs, prostigmine (or neostigmine) is showing the greatest promise. This drug has been used for years as an aid in the relief of post-operative distension. More recently, Kabat and Knapp[2] showed decreased hypertonus and "muscle spasm" in the acute stage of poliomyelitis. Based on this, Kabat studied its effect on a variety of types of neuro-muscular dysfunction such as trauma, cerebral palsy and rheumatoid arthritis. He found definitely favorable results in terms of increased range of motion and decreased muscle spasm, and better function, in cases of acquired disability, especially. In cases of cerebral palsy from birth, contractures and deformities were definitely improved.

Prostigmine has been used by us for the last three years in a wide diversity of cases of cerebral palsy and to date the following conclusions can be drawn. First, it definitely facilitates the correction of contractures by corrective braces or wedged casts both as regards speed of correction and the comfort of the patient when dealing with rigidity in which it seems most effective, and with spasticity, in which results are slightly less striking. Second, it facilitates reciprocation of antagonistic groups (apparently by lessening the stretch reflex) in true spasticity, thus speeding up free use of the joint. Third, it seems to have no effect whatever in pure athetosis, although it lessens tension to some extent in some tension athetoids. These, however, may represent mixed cases of athetosis and rigidity. Fourth, in our experience, the most definite improvement has been in clearing speech difficulties, where the trouble is spasticity or rigidity in the tongue or other parts of the speech mechanism. Pure athetoid speech defects uncomplicated by tension have not, in our experience, been changed at all.

The effects have been most noticeable in speech, less so in arm and hand use, and least noticeable in the legs. This would suggest that when effective the drug is more useful in fine coordinated motions of the tongue and fingers, than in large muscle groups. Kabat has pointed out that there seems to be a definite central neurological effect of this drug in addition to its peripheral effect on the neuromuscular function. It is definitely our opinion that the groups of drugs (the cholinergics), to which prostigmine belongs, offer great promise as adjuncts in the treatment of cerebral palsy.

Another class of drugs which offers possibilities is the hydantoin group, of which the best known is dilantin sodium (diphenyl hydantoin sodium). This drug is widely used as an anticonvulsant in epilepsy and, as a substitute for phenobarbital has many advantages. It is definitely a relaxant and not an analgesic or sedative. It has been pointed out that it is useful not only in epilepsy but in certain behavior difficulties described as "epileptic equivalents." In most of these cases there is definite increased tension, probably of organic, occasionally perhaps of psychogenic origin, which is decreased by dilantin. In the cerebral palsies in which we have used it, there is undoubtedly some improvement in relaxation, especially in situations where tension would ordinarily be increased (for example, by excitement). Thus its usefulness seems to be greater in tension athetosis than in such conditions as spasticity or rigidity.

For the last three years we have also been using curare and its associated synthetic derivatives such as "intocostrin," and beta-dihydroerythroidin. These drugs have been relatively disappointing in cerebral palsy. Of course, they have a definite place in electric and other forms of shock therapy in the field of psychiatry, and late reports suggest other valuable uses, such as relaxant adjuvants to anesthesia in major

surgical operations. In cerebral palsy, using all forms, we have found that complete relaxation can be attained in athetosis, but that there is no carry over of improved function when the effects of the drug have worn off. We have worked with this over periods of months, keeping graphic records, with no positive results.

In spasticity the results with the curare derivatives are still somewhat indefinite. Here they may be proved of definite value but it is too early to be sure.

All of these studies are still in progress and the statements made are not to be considered final, but rather to show that in this field drugs will have a definite value. Much further work is necessary and concrete reports will be forthcoming, not only on the use of the individual drugs, but also in combinations.

In conclusion, it can be stated that the general future for reclamation of cerebral palsy is much brighter as our knowledge of differentiation of the various types develops. It also clearly indicates that, surgical and rehabiliation therapy (such as physiotherapy, occupational therapy, and speech therapy), and drugs will all play a definite but specific part in the various types.

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TUMORS OF THE LUNG*

By O. THERON CLAGETT, M.D.
Rochester, Minnesota

Until recently, the subject of intrathoracic tumors was largely of academic interest because these tumors were believed to be of rare occurrence and because there was little or nothing of a therapeutic nature that could be done for them anyway.

It has become apparent that physicians must revise their attitude toward these tumors. Rapidly increasing experience with thoracic medicine and surgery in recent years has shown conclusively that thoracic tumors are not so rare as formerly was believed but that they are among the common tumors of the body. With developments in the field of thoracic surgery, many of these tumors have become amenable to surgical treatment. With the knowledge that thoracic tumors are not uncommon and that they can be treated successfully, physicians everywhere must accept the responsibility for their early diagnosis so that surgical treatment can be undertaken at an opportune time.

A new development promises to give great impetus to the demand for increasing interest in, and knowledge of, thoracic tumors; that is, the thoracic roentgenologic survey of large masses of the population. Some of these projects are under way and many others are planned for the near future. Although the surveys are being undertaken primarily for the discovery of instances of pulmonary tuberculosis, a large number of other thoracic lesions are being disclosed and the affected patients are being referred to their physicians for diagnosis and treatment. As an example, in St. Louis County, Minnesota, an attempt is being made to obtain thoracic roentgenograms of every person in the county. So far, 72,433 persons have undergone roentgenographic examination of the thorax and twenty-eight tumors have been found. These twenty-eight cases of tumor do not include cases of tuberculoma, aneurysm or atelectatic lesions. This partial survey of one county of one state indicates the magnitude of the problem of thoracic tumors and the necessity for a greater knowledge of the types of thoracic tumors, their manifestations and treatment. Of all the various intrathoracic tumors, those arising in the lung are the most common and of greatest interest.

This paper will be concerned with this group which consists of carcinoma of the lung; adenoma of the bronchus, and a miscellaneous group comprised of unusual tumors, such as mixed tumor, chondroma, hamartoma and others.

CARCINOMA OF THE LUNG

Not many years ago, carcinoma of the lung was considered a rare clinical entity. It now is known that at least 10 per cent of all deaths due to carcinoma are caused by carcinoma of the lung and that of all deaths due to carcinoma, the number due to carcinoma of the lung is exceeded only by those caused by carcinoma of

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*Division of Surgery, Mayo Clinic.

the stomach. It becomes obvious that carcinoma of the lung is a major problem in cancer therapy. It is interesting to note that, whereas the incidence of carcinoma of other organs has not shown a significant statistical increase in recent years, there has been a progressive increase in the incidence of pulmonary carcinoma. Various theories have been suggested to account for this fact but I shall not consider them at this time.

Carcinoma of the lung may develop at any age but is usually found in persons between forty-five and sixty-five years of age. In 88 per cent of a series of 448 cases of proved carcinoma of the lung reviewed recently, the patients were more than forty years of age. Men are afflicted with carcinoma of the lung about four times as frequently as are women.

Carcinoma of the lung presents no pathognomonic symptom complex. It can simulate many other pulmonary conditions. However, in nearly every case, symptoms develop early in the course of the illness and suggest the presence of disease of the thorax. It is regrettable that, in our experience, the histories given by patients on admission to the clinic indicate that an average of a little more than eight months had elapsed between the date of onset of symptoms suggestive of the presence of thoracic disease and the date of accurate diagnosis of the condition. Cough is the most common early symptom and usually is the first manifestation of the disease. Hemoptysis may occur and was noted in 53 per cent of our cases. Wheezing, dyspnea and pain in the thorax are noted frequently. Loss of weight is a highly significant indication of the disease. Seventy per cent of the patients in our series had lost more than ten pounds (4.5 kg.). There frequently is a history of prolonged chest colds and recurrent attacks of pneumonia. Any patient who has any symptoms referable to the thorax that cannot be definitely accounted for on some other basis should be suspected of having a carcinoma of the lung and should be studied accordingly.

Roentgenographic studies of the thorax are a most valuable diagnostic aid in cases of carcinoma of the lung. For purposes of roentgenographic description, Kirklin[5] has said that pulmonary carcinoma may be divided into three groups: (1) the group in which the tumor casts a distinct shadow, which constitutes the predominant roentgenographic finding; (2) the group in which secondary manifestations, such as atelectasis, comprise the outstanding finding; and (3) the group in which complicating factors, such as bronchiectasis, pulmonary abscess and pleural effusion, are the predominant features and often completely overshadow the underlying tumor. Carcinoma of the lung may produce bizarre roentgenographic findings that defy accurate interpretation. In spite of the variety of roentgenographic manifestations of carcinoma of the lung, a correct roentgenologic diagnosis was made in 73 per cent of 448 proved cases observed at the clinic. It should be pointed out that a normal roentgenogram of the thorax does not necessarily rule out the presence of pulmonary carcinoma. If the history and physical findings suggest the possibility of carcinoma of the lung, further investigation is indicated.

Bronchoscopy is an invaluable aid in diagnosis and should be carried out in every case in which the possibility of carcinoma of the lung is suggested. In 70 to 75 per cent of cases, the lesion occurs in bronchi accessible to bronchoscopic examination and biopsy. Bronchoscopy not only furnishes accurate information about the pathologic nature of the bronchial lesions but also is of value in determining the exact site of the lesion and thus provides important information regarding the operability of the lesion.

From a surgical standpoint, definite proof of carcinoma obtained by microscopic examination of tissue that has been removed bronchoscopically is highly desirable before a patient is submitted to thoracotomy. However, in at least 25 to 30 per cent of cases of pulmonary carcinoma, the lesion is not accessible to bronchoscopic biopsy. These lesions would become inoperable if positive proof of the diagnosis were demanded before a patient was accepted for operation. I feel very strongly that no patient should be denied the benefit of thoracic exploration if the history, clinical examination and roentgenographic studies suggest the presence of carcinoma of the lung. The thorax is just as accessible to exploration of indeterminate lesions as the abdomen is, and the risk of operation is no greater. Competent surgeons do not hesitate to perform exploratory laparotomy for

indeterminate tumors or lesions of the abdomen and they should not hesitate to perform exploratory operations on the thorax. I believe that exploratory thoracotomy is a justifiable diagnostic procedure in cases in which carcinoma of the lung is suspected.

Treatment.—There is at present only one successful treatment for carcinoma of the lung and that treatment is surgical resection of the involved portion of the lung and the regional lymph nodes. Considerable experience has shown conclusively that radiation therapy is not effective. The surgical treatment of carcinoma of the lung is based on the same principle as surgical treatment of carcinoma in other sites; that is, resection of the lesion and the regional lymph nodes. Obviously, many special problems attend the removal of an organ as vital as the human lung. However, these problems have been overcome to a great extent. Although only twelve years have elapsed since Graham performed the first successful pneumonectomy, the operation is now common, and a number of surgeons have reported a rather large series of cases in which the operation has been performed. Rienhoff[7] has reported a series of 181 cases in which operation was performed, in seventy-one of which resection was possible. Graham[3] has reported a series of seventy-five cases in which pneumonectomy was performed; in seventy of the cases, the operation was performed for carcinoma. Two years ago, Brindley and I[2] reported a series of ninety cases in which exploration was performed. Resection was performed in forty-five of these cases.

It is impossible to lay down any hard and fast rules to govern the indications for thoracic exploration in cases of suspected or proved carcinoma of the lung. There should be roentgenographic or bronchoscopic evidence of a pulmonary lesion and every attempt should be made to rule out other pulmonary conditions, such as abscess of the lung, bronchiectasis, tuberculosis and so forth. The patient should be in good general condition; the heart and opposite lung should be essentially normal.

Age, in itself, should not necessarily contraindicate surgical intervention; however, few patients more than sixty-five years of age probably will be suitable for operation. In many cases, the condition is found to be inoperable at the time of thoracic exploration. However, the rate of operability in these cases is at least as high as that in cases of carcinoma of the stomach.

Not enough patients who have undergone pneumonectomy have been followed for a long enough period to permit an accurate evaluation of prognosis. So far, the evidence indicates that the rate of survival after pneumonectomy for carcinoma is at least as favorable as that after resection for carcinoma of the stomach, and it may be more favorable.

I certainly do not minimize the seriousness of pneumonectomy. It is a formidable procedure under any circumstances. It is remarkable that the operation can be performed with a mortality rate of only 10 to 15 per cent at present. With further experience, I am confident that this rate will be reduced.

Carcinoma of the lung is a common condition and apparently is increasing in frequency, as compared with malignant lesions in other parts of the body. Pneumonectomy is established as the most effective treatment available. It is a logical procedure based on sound surgical principles. Earlier diagnosis of carcinoma of the lung will contribute more to the effectiveness and safety of the operation than any other factor. Thoracic exploration should be performed in cases of indeterminate thoracic lesions in which the history and examination suggest the presence of carcinoma, as well as in proved cases of carcinoma of the lung in which surgical treatment is not definitely contraindicated.

BRONCHIAL ADENOMA

Bronchial adenomas are a most interesting group of pulmonary tumors. According to Graham and Womack[4] they result from failure of embryonic bronchial buds to develop into normal structures. Pathologists are not in complete agreement as to whether these tumors are benign or malignant and I do not intend to enter into this argument at present. Regardless of whether they are benign or malignant, they are very much different from carcinoma of the lung. Whereas pulmonary carcinoma occurs four times as frequently in men as it does in women, 60 to 80 per cent of bronchial adenomas occur in women. The great majority of bronchial adenomas occur in persons less than forty

years of age, whereas only 10 to 15 per cent of bronchial carcinomas occur in persons of this age group. Bronchial adenomas always occur in the main stem bronchi and are almost always accessible to bronchoscopic examination and biopsy, whereas 25 to 30 per cent of bronchial carcinomas are situated in a portion of the lung that is beyond bronchoscopic reach. Even more important than these differences is the difference in the prognosis of the two conditions, as indicated by figures from the Massachusetts General Hospital.[1] Of a series of 155 patients with bronchial carcinoma, only 3 per cent were alive three to five years later. Of a series of seventeen patients with bronchial adenoma, 88 per cent were alive and well after the same period. It is indeed unfortunate that only about 10 per cent of pulmonary tumors are bronchial adenomas.

Bronchial adenomas in some instances may produce symptoms similar to those produced by carcinoma of the lung. Usually, however, the symptoms are of longer duration, as would be expected with such a slowly growing, relatively benign type of lesion. Cough is an outstanding early symptom. Hemoptysis and even severe hemorrhages are characteristic. Recurrent attacks of pneumonia are common. Roentgenologically, the tumor itself is rarely visible. As would be expected in the case of a lesion involving the main bronchi, atelectasis of the portion of the lung distal to the tumor is the common roentgenologic finding. The bronchoscopic appearance of a bronchial adenoma is characteristic. The tumor projects into the bronchial lumen as a smooth, rounded pink mass. Ulceration is not common. The base of the tumor is quite broad and often only a small portion of the tumor lies within the bronchial lumen.

Treatment.—There is still some difference of opinion about the best method of treating bronchial adenoma. Since most of these tumors are accessible to bronchoscopic removal and since they grow slowly, and are relatively benign, some enthusiasm has developed for bronchoscopic removal of the tumors rather than pulmonary resection. I believe bronchoscopic treatment of these tumors should be used only when the general condition of the patient will not permit pulmonary resection, for the following reasons: (1) There usually is extensive pulmonary damage, particularly pulmonary suppurative disease distal to the lesion. (2) It is impossible to remove the entire growth since most of the tumor usually lies outside the bronchus. (3) Repeated bronchoscopy at frequent intervals for the rest of the patient's life would be necessary. (4) These are very vascular tumors and severe hemorrhage may be encountered at the time of bronchoscopic removal. (5) Even though these tumors grow slowly and are relatively benign, authentic instances of metastasis have been reported. (6) The risk of surgical resection is not great; the mortality is only about 5 per cent.

Although I do not recommend bronchoscopic removal of these tumors as a definitive measure the importance of bronchoscopy cannot be overemphasized. Bronchoscopy furnishes material for pathologic study, and with accurate information as to the nature of the lesion, it often is possible to perform lobectomy rather than the pneumonectomy that would be necessary if the lesion proved to be a carcinoma. Bronchoscopic removal of a lesion obstructing the bronchus will relieve the atelectasis and permit drainage of the suppurative process distally so that the patient can be brought into more favorable condition for pulmonary resection. I do not believe that pneumonectomy is necessary in the treatment of bronchial adenoma unless the site of the adenoma makes lobectomy impossible or unless regional lymph nodes show evidence of metastasis.

HAMARTOMA

In addition to bronchiogenic carcinoma and bronchial adenoma, there is another group of thoracic tumors which we have designated as hamartomas. "Hamartoma" is a term that means "to fail" or "to err" and is used to designate tumor-like formations in which there occurs an abnormal mixing of the normal components of the organ. We have confined the use of the term "hamartoma of the lung" to a specific type of tumor of the lung which has a characteristic morphologic appearance. This is a solid tumor of the bronchus which is composed of benign mesodermal and benign epithelial elements.

McDonald, Harrington and I[0] recently reported twenty-three cases of hamartoma of the lung. In all of these cases the tumor was situ-

ated in the parenchyma of the lung. In most cases it was situated subpleurally. The tumors varied in size from 0.2 to 9 cm. in diameter. On gross examination, they are whitish and sharply circumscribed. On histologic examination, islands of cartilage cells are found in nearly all cases and may predominate. Connective tissue in varying amount was present in all cases. Glandular epithelium, in some cases ciliated, is present in nearly all cases. Fat, muscle and bone are a common histologic finding in these tumors.

Because of the site and character of these tumors, they seldom produce clinical symptoms. In most cases the tumor is discovered on routine roentgenographic studies of the thorax and at necropsy. Roentgenologically, these tumors are characterized by a dense, rounded or lobulated shadow surrounded by normal pulmonary markings. There often are scattered areas of calcification throughout the tumor. Pulmonary lesions that must be considered in differential diagnosis include primary carcinoma of the lung, single metastatic carcinoma of the lung, tuberculoma, Ghon complex, thoracic cysts and so forth. Since these lesions are peripherally situated, bronchoscopy is not of value in diagnosis. It usually is impossible to make a clinical diagnosis of hamartoma. It can be only suspected by the roentgenologic appearance of the lesion.

Although hamartoma of the lung is a benign, slowly growing, asymptomatic tumor, it should be removed surgically, provided, of course, operation can be performed with a reasonable risk. There are no good tumors; furthermore, it is impossible to distinguish these tumors from more serious lesions with certainty before operation. Local excision may be sufficient in many cases. The situation of the tumor occasionally may make lobectomy or pneumonectomy necessary.

SUMMARY

Pulmonary tumors have become a problem of increasing concern to members of the medical profession. With development in programs of thoracic surveys by roentgenographic examination of large groups of people, an increasing number of thoracic tumors undoubtedly will be discovered and will require treatment. Successful treatment requires early diagnosis, and this can be achieved best by development of a suspicious attitude regarding any thoracic symptoms and the institution of roentgenographic and bronchoscopic studies as early as possible. Surgical resection is the only satisfactory treatment available for most thoracic tumors. Surgical resection of pulmonary tumors can be performed with satisfactory results only if the patient is brought to the attention of the surgeon at an opportune time.

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DISCUSSION (*Abstract*)

Dr. Edward J. McGrath, Cincinnati, Ohio.—The position of the problem of tumors of the lung is today what that of carcinomas of the breast and uterus and stomach and rectum were in the early part of this century. The profession as a whole is barely becoming aware of the ubiquity of this type of tumor, as Dr. Clagett said. In the earlier part of the century Adler collected 374 cases and concluded that the consensus of opinion was that this was the rarest type of malignancy. Yet today we know that 15,000 people in the United States die annually of carcinoma of the lung.

It is imperative that the profession become fully aware of the fact that there is such a thing as malignancy of the lung and that it is a quite frequent lesion, if we are to make any progress in treatment. The diagnosis in stages when the tumor is remediable must be made in the towns and villages in general private practice, rather than at the Mayo Clinic or the University of Cincinnati, or Johns Hopkins, or some of the other centers where patients are sent when it cannot be determined quite what is wrong. We cannot diagnose what we do not look for, and we do not look for what we do not think about.

I should like to make one point out of my own rather brief experience, and that is that there is no such thing as a good tumor of the chest. Unfortunately, rather extensive discussions of the bizarre and not too well understood things, such as the hamartomas, as well as the conflicts that have arisen as to their malignancy or etiology, may breed in the mind, at

least of the general physician, the idea that there may be such a thing as a "safe" tumor.

We have had the experience in this city of seeing a patient's condition diagnosed as a benign tumor of the lung, with the decision "We will watch it." It was watched for approximately two months, and by that time the carcinoma had become very nearly incurable. We succeeded in getting the lung out. I believe this danger to be a very real one.

Many patients come to physicians because they have symptoms which disturb them, a cough which has lasted too long, a little bit of blood-spitting, and they have been pushed off and told that they should take the cough medicine, and wait and see, instead of having the lesion thoroughly investigated.

Dr. Richard H. Overholt, Boston, Mass.—We have heard an interesting presentation of an important subject. My own experience is in complete agreement with the observations of both the speaker and the discussors. Now we are all challenged to speed up the mechanism of discovery of tumors of the lung in view of their possible success of treatment.

About half of all of patients with cancer of the lung who are referred to us are found to have a growth that is out-of-bounds and must be rejected for any form of surgical treatment. Exploration of the chest is carried out in the other half and we find that we can carry out a curative type of resection in approximately 50 per cent of these. There is today, therefore, a running chance to help about 25 per cent of the entire group referred for treatment. The operative mortality is running under 10 per cent for lung cancer and a certain number will die of metastatic disease. Subtracting these groups, we have a cure rate of somewhere between 10 and 20 per cent of all of those patients originally examined.

Some time ago, we looked up the matter of the time interval involved in the management of lung cancer. The average patient saw his physician three months after the onset of symptoms. The first x-ray of the chest was not ordered until three months after the first physician was consulted. There was a further delay of another six months until the diagnosis was finally established. Frequently the roentgenologist would not venture a possible diagnosis of cancer until serial films had revealed a change in the size of the shadow. The average patient in our group was not diagnosed until nine months after the first doctor was consulted and a full year after the first symptoms appeared.

Dr. William F. Rienhoff, Jr., Baltimore, Md.—I do not believe that Dr. Clagett made clear the necessity for doing total pneumonectomy in the treatment of malignant tumors of the lung. I wish to emphasize this point because there are those who have suggested that lobectomy may be as efficacious an operative procedure, particularly in very early cases. I disagree with this idea because of the fact that the fissures in the lung are rarely complete and the spread of carcinoma may be retrograde into the lymphatics or into the adjoining lobes away from the hilus. In other words, the lymph which is usually centripetal may well be centrifugal. I do not believe there is an instance on record of true carcinoma of the lung that has been cured by lobectomy.

I would also like again to state the advantage of artificial pneumothorax. There are many reasons that I could mention which make this simple procedure a definite aid in preparing the patient for operation, but the most important advantage to be derived is a determination of the ability of the patient to breath satisfactorily with the contralateral lung. If there is a degree of undetectable emphysema and the patient cannot stand a collapse on this side, it is important to know this before one subjects the patient to a total pneumonectomy. We have recently had a striking example of this with a patient in the upper fifth decade, in whom an emphysema was not suspected and when fifty per cent of the affected lung was collapsed the patient was not able to walk across the room because of shortness of breath.

Dr. Clagett (closing).—I certainly think a pneumonectomy should be done for cancer of the lung. Lobectomies may be done for adenomas, if the lesion will permit.

SOME PRACTICAL ASPECTS OF THE CHEMISTRY AND PHARMACOLOGY OF LOCAL ANESTHETIC DRUGS*

By JOHN ADRIANI, M.D.
New Orleans, Louisiana

For practical purposes, local anesthetics may be placed into three general groups. The first of these, which contains the majority of drugs in common use, is composed of complex esters. Esters form when an alcohol interracts with an acid. One or more atoms of nitrogen, usually in the form of an amino group, is present on the molecule. The nitrogen may be on the acid or the alcohol part of the molecule, or both. The basic properties of these compounds is due to the nitrogen. The second group, which is relatively unimportant, consists of phenolic and alcoholic compounds. Menthol, phenol, benzyl alcohol, and salignenin are typical examples of members of this group. They are used almost exclusively for surface anesthesia and rarely for infiltration. The third group is composed of

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*From the Department of Anesthesia, Charity Hospital and the Department of Surgery, Louisiana State University School of Medicine, New Orleans, La.

miscellaneous compounds which do not fall into the first two groups. Nupercaine, eucupine, holocaine, and quinine are the important drugs in this group. They are complex compounds containing nitrogen also. They are similar to the ester type of drug in pharmacological and physical behavior, but are structurally different.

With the exception of cocaine, all the currently employed local anesthetic drugs are synthetic substances. Since they are bases, they react with acids such as hydrochloric, sulphuric, boric, acetic, and others to form salts. The reaction is similar to the formation of a salt between ammonia and an acid. The salts for the most part are solid crystalline substances. Salts of local anesthetics form aqueous solutions which are acid in reaction. The addition of alkalies to a solution of the salt causes precipitation of the free base. The base is usually a high boiling point liquid or an amorphous solid. The bases, as a rule, are less soluble in water and less stable than the salts. The bases readily dissolve in lipoids and lipoid solvents, a fact of importance in the preparation of ointments and oily solutions. Salts do not readily dissolve in lipoids and oils and are therefore not suitable for ointments. Local anesthetics differ little from alkaloids, and possess most of the chemical and physical properties characteristic of alkaloids. They respond to the same color tests and precipitation reactions as do alkaloids when treated with alkaloidal reagents.

Local anesthetic drugs are readily adsorbed to such surfaces as activated charcoal, silica gel, and other adsorbents. They lower surface and interfacial tensions and influence the stability of colloids.

The most important local anesthetics among the esters are those derived from para-amino benzoic acid. Procaine, or novocaine, the most prominent drug of this series, results when para-amino benzoic acid is esterified with diethyl-amino-ethanol. Pontocaine, monocaine, amylcaine, butyn, larocaine, tutocaine, anesthesin, and butescin are also esters of para-amino benzoic acid and aliphatic alcohols or amino alcohols. Another important series of esters is derived from benzoic acid. Cocaine and metycaine are two currently used drugs in this series. Cocaine is the benzoic acid ester of methyl ecgonine. A number of less toxic compounds have been prepared by modifying the ecgonine portion of the cocaine molecule. Alpha and beta eucaines, the tropocaines, and metycaine are notable examples. Metycaine is the only one of these which is currently employed. Stovaine and alypin are benzoates of aliphatic amino alcohols. Another group of esters is formed from cinnamic acid. The most important drug in this group is aposthesine. Another series is formed by esterifying para ethoxy benzoic acid with amino alcohols. This acid merely replaces the amino group of amino benzoic with the para ethoxy ($-O-C_2H_5$) group. The homologue to procaine in this series has recently been marketed as "intracaine."

In the miscellaneous group, "nupercaine," which is derived from quinoline, is a substituted amide. Eucupine, somewhat similar in structure to quinine, is a cupreine. "Holocaine" is prepared from para ethoxy aniline (phenetidin), which forms the basis of phenacetine and other antipyretics.

PHARMACOLOGY

Local anesthetics in contradistinction to general anesthetics exert their effect at the site of application of the drug. The mechanisms by which they produce anesthesia are still topics of speculation. They may cause a decrease in cell permeability by disturbing the concentrations of various ions, particularly potassium, on the surface layer of the nerve. This in turn is followed by a decrease of electrical conductivity in the nerve and interference with transmission of impulses. Possibly an ultramicroscopic coagulation of colloids effects changes in metabolism of the cell. The bases of local anesthetics are soluble in lipoids. In this respect, they behave similarly to general anesthetics. An affinity exists between these drugs and cells of high lipoid content such as those of the nervous system.

The usefulness of a local anesthetic drug depends chiefly upon three factors: its solubility, its potency, and its toxicity. Obviously, a given derivative must possess some degree of water solubility to be carried into the cells. "Benzocaine," "propaesine," and "anesthesin" are relatively ineffective drugs because they are insoluble in water. Numerous drugs have been prepared possessing local anesthetic action whose

usefulness has been limited because they were insoluble compounds.

The potency of a drug is an inherent part of its chemical structure. Slight modifications and rearrangements of the molecular structure of a compound modify its pharmacologic action. When the ethyl groups of the ethanol-amine portion of procaine are shortened to methyl groups and a butyl group is placed on the amino group in the para position, "pontocaine" results. The potency is increased ten times by this structural modification. On the other hand, the mere removal of a methyl group from the ecgonine portion of cocaine nullifies its anesthetic activity.

Toxicity, like potency, is a function of chemical structure and varies with it. Two types of toxicity are recognized: a general or systemic toxicity which appears when the drug gains access to the blood stream, and a local or tissue toxicity. Systemic toxicity will be discussed subsequently. The action of clinically applicable local anesthetic drugs is reversible, that is, the cells to which they are applied regain their normal functions and structure when the drugs are removed. Certain drugs do not possess this reversibility of action and cause damage to the nerve cell or to the surrounding tissue. "Nupercaine," quinine, and certain of its derivatives have been known to be locally toxic. Damage to nerve fibers and slough of surrounding tissues have been reported. Local toxicity increases as the concentration of the drug increases. Local toxicity varies with the mode of administration and the type of tissue into which the drug is injected.

Both toxicity and potency are modified by such factors as concentration of the drug, the nature of the tissue into which it is injected, the blood supply to the tissue, and the size of the nerve fiber to which the drug is applied.

In order to be effective, a local anesthetic drug must come into direct contact with nerve tissue. Any type of nerve tissue is susceptible. The drug acts by preventing conduction in a nerve unit. Whether applied to the cell body or to a nerve fiber, the action is the same. In clinical use, the drug is applied at one of the following sites: in the subarachnoid space (spinal block), in the peridural space (epidural block), on a spinal nerve, paravertebrally (paravertebral block), along the course of a nerve before it branches (nerve block), to several of its branches after it has divided (field block), and to the nerve endings. When applied at the nerve endings, it is either by injection over a wide area (infiltration) or by application on a membrane in which the nerve endings are distributed (topical). The potency of a given drug varies with these technics of application. Several factors combine to cause this variation, the chief one being the power of penetration. In the epidural space where the fibers are sheathed with a covering of dura, the concentration of procaine for anesthesia must be almost ten times as much as is necessary in the subarachnoid space where the roots are naked. Half per cent solutions of procaine are sufficient for the naked nerve endings in infiltration technics. This concentration, however, is insufficient to block the majority of the peripheral nerves which necessitate 1.5 or 2 per cent solution. Certain drugs easily penetrate mucous membranes and are excellent for topical anesthesia; others possess no penetrating power whatever. Procaine, unless used in exceptionally high concentration, is useless for topical anesthesia. "Pontocaine," "metycaine," "nupercaine," cocaine serve well for this purpose, however. Along with penetrating power, size of nerve fibers is an important factor. It is a well established pharmacological fact that the sensory and autonomic fibers of a mixed nerve are affected before the motor fibers. This difference formerly was attributed to a difference in structure and in composition of the fibers. It is now recognized that the difference is due to size of fibers. The sensory and autonomic fibers are smaller than the motor, and more susceptible. Therefore, they are affected first. Non-myelinated fibers are affected before myelinated fibers and nerves without sheaths before those with sheaths. The concentrations of drugs ordinarily used clinically affect all three types of fibers. However, if solutions are sufficiently dilute, the majority of the sensory fibers may be blocked without affecting any appreciable number of motor fibers. In spinal anesthesia, this occurs frequently. In the lumbar area at the site of injection, motor sensory and autonomic fibers are affected since the greatest concentration of drug is in this

area. In the thoracic region, if minimal doses of the drug are employed, the solution is dilute; little if any motor anesthesia is present. Sensory anesthesia, however, is well established. Larger doses cause a greater concentration of drug in this area and increase the extent of motor paralysis. The motor paralysis is to a large measure responsible for the physiological disturbances, particularly those referable to the circulation, which occur during spinal anesthesia. When relatively less potent drugs, such as procaine or metycaine, are employed as the anesthetic agent, greater leeway is allowed in the estimation of dosage than when drugs of high potency are employed. An error in estimation of dosage amounting to one milligram of "pontocaine" is comparable to 10 to 15 milligrams of procaine. Severe physiologic disturbances are often encountered following the intrathecal use of high potency drugs. Erroneously, this undesirable behavior is blamed upon the drugs and they are discarded because they are "too toxic." Actually, it is overdosage which is responsible and not toxicity. The physiological disturbances depend upon intensity of anesthesia, or degree of combined motor paralysis and sensory anesthesia. Intensity in turn depends upon dosage and dosage in turn depends upon potency.

Duration of action, likewise, varies with the chemical nature of the drug. Again variable factors, such as mode of administration, concentration, and duration of contact with nerve modify duration of action. Procaine intrathecally in clinical use blocks conduction for 45 to 60 minutes. The same drug injected intradermally in stronger concentration anesthetizes the skin for an average of ten minutes. The addition of a vasoconstrictor drug to a solution of a local anesthetic drug inhibits the removal from the area of activity and prolongs the drug's action. Intrathecally, under these circumstances, procaine lasts 1½ hours; intradermally, 1½ hours.

The highly potent drugs, such as "pontocaine," "nupercaine," and eucupine are characterized by prolonged action. Likewise, the establishment of anesthesia with longer-acting, more potent drug requires a longer time interval than with the less potent drugs. Procaine introduced intrathecally causes blockage of motor and sensory fibers within one to two minutes. "Pontocaine" or "nupercaine," under similar circumstances, are not nearly so rapid in action. When "pontocaine" and "nupercaine" are used intrathecally, hypalgesia first ensues, then sensory anesthesia, which in turn is followed by motor paralysis. As long as five and in some cases ten minutes may elapse before anesthesia is fully established. This behavior is of utmost importance in spinal anesthesia when the long-acting drugs are employed. During the induction period of spinal anesthesia with "nupercaine" or "pontocaine," hypalgesia ensues almost immediately in the spinal segments affected by the drug. Complete insensibility does not occur for several minutes. Therefore, one must seek the hypalgesic areas during the sensory examination to establish the desired extent of anesthesia.

Certain substances potentiate the action of local anesthetic drugs if added to their aqueous solutions. Potassium ions enhance the effect of many drugs. However, in clinical use, infiltration with the salts of potassium cause pain, edema, and redness of the tissue when the effects of the drug disappear. Proteins added to aqueous solutions also potentiate anesthetic action. Gliadin, plasma, and serum albumin have been added to procaine for this purpose. The increase in duration of anesthesia is not remarkable from a clinical standpoint and the benefits derived are not worth the trouble entailed. Alkalinization of solutions of anesthetic drugs has been attempted from time to time. The free base is the agent which penetrates into the cell and causes the physiologic changes, and not the salt. However, clinical and experimental trials have proved that alkalinization is of little practical value for infiltration or nerve blocks. Regardless of the reaction, any solution upon injection becomes adjusted to the hydrogen ion concentration of the tissues by virtue of the buffer action of the electrolytes in the interstitial fluid. An acid solution, which is the usual reaction of most solutions used clinically, because salts are employed, is raised to the pH of the tissues. The pH of an alkaline solution is lowered to that of the tissues. Potentiation by alkalinization does occur if the drug is used for topical anesthesia, however. Vasoconstrictor substances are the only substances added to local anesthetic drugs which are of any thera-

peutic value. They decrease toxicity and prolong the action by causing local ischemia. Although a host of vasoconstrictor substances are available, the most efficient of the group is epinephrine. Results with ephedrine, synephrin, and related amines have been disappointing.

There are numerous and varied methods of testing the toxicity and efficiency of local anesthetic drugs. Topical application to the cornea or mucous membranes of animals or man, intradermal injection into animals and man, direct application to nerves or spinal cord of man or animal are some of the technics which have been used to investigate the efficacy of these drugs. The results obtained by these different methods cannot be compared unless the experiments are performed under identical conditions.

In the last analysis, the value of a local anesthetic drug is decided by its toxicity. Irrespective of the manner of administration of a local anesthetic drug, ultimately it gains access to the systemic circulation. The less the blood level necessary to cause untoward symptoms, the more toxic the drug. The blood level and the toxicity, therefore, will depend largely upon the rate of absorption of the drug from the site of injection and its rate of disappearance from the blood stream. Disappearance from the blood stream and cells depends upon the ease which the body detoxifies or eliminates the drug. Absorption will depend largely on the vascularity of the tissue and the concentration employed. Absorption is rapid from highly vascular areas such as the scalp or from mucous membranes. Minute amounts of the drug can be circulated in the blood for some time after injection of a solution into the tissues and cause some systemic anesthesia. During infiltration anesthesia with procaine an increase in the pain threshold on the skin of the forehead and other parts of the body can be demonstrated in addition to the local action. This systemic effect is due to the drug absorbed from the site of injection and its distribution to the nerve endings in the body. For this reason, certain drugs are unfit for clinical use because the amount absorbed from the site of injection even though it is minute, is sufficient to cause systemic toxicity as it circulates in the blood stream. Procaine causes a mild depression because of its low toxicity. The potency of a local anesthetic drug and its toxicity do not necessarily parallel each other. Toxicity, therefore, is an important value to establish for a drug and unfortunately a difficult one. Usually the lethal dose is established by observing the effects of intravenous injection in animals. Unfortunately, results of animal experimentation cannot be applied directly to man. They do, however, serve as a general guide to the possible behavior in man. The clinical usefulness and safety of a new local anesthetic drug can be established only by its cautious, repeated use by careful observers.

Two types of local anesthetic drug reactions are recognized. One of these termed "idiosyncrasy" occurs when minute amounts of a drug, usually a quantity far less than is necessary for anesthesia, are injected into tissues or applied topically to a mucous membrane. Without warning, the patient develops syncope and before therapeutic measures can be instituted, circulatory and respiratory failure have ensued. Apparently the patient is "sensitive" to the most minute amounts of drug. The underlying mechanism is far from being well understood. Death presumably is due to cardiac failure.

The other type of response, commonly termed a "reaction," is more common, carries a better prognosis, and is avoidable because it is due to overdosage resulting from carelessness or ignorance. In this type, symptoms arise from disturbance of three important physiological systems: the central nervous system, the respiratory system, and the circulatory system. Two phases may be recognized in a toxic reaction, one of stimulation which appears first and one of depression or paralysis. If the dose is overwhelming, the stimulating phase may be fleeting and unnoticed. The central nervous system is stimulated from the cortex downward. Increased mental keenness, talking, excitement, and vomiting are the usual prodromal signs. These are usually passed off as "hysteria" or "apprehension" by the uninitiated. Convulsions then appear. Depression or paralysis of the central nervous system then follows. Small doses of local anesthetic drugs intravenously increase the sensitivity of the cortex to electrical stimulation. Convulsions occur more consistently in species having a high degree of cortical development. A rise in blood pressure is observed first, due to

stimulation of the vasomotor center. As absorption proceeds, depression and paralysis of the medullary center cause a fall in blood pressure. Bradycardia may be observed at the onset of the "reaction" due to the depressant action on the myocardium which many of the drugs exhibit. Also, this is possible from stimulation of the vagus center. Small doses may cause local peripheral vasoconstriction which may contribute to the rise in blood pressure. Large doses invariably depress the circulatory system. Small doses stimulate respiration, causing an increase in amplitude and rate. Larger doses depress the respiratory centers. During the convulsive phase the muscle spasm may interfere with pulmonary ventilation. The following sequence of events occurs in animals when toxic doses are given intravenously; respiratory stimulation, elevation in blood pressure, followed by a depression below the control level, slowing of the heart, probably due to the myocardial depression; then an improvement of the heart beat with an increase in blood pressure; then respiratory paralysis followed by convulsions. In *man* this sequence of events is different. Usually the central nervous system stimulation accompanies or even precedes the circulatory and respiratory effects. Excitement and apprehension following the application or injection of a local anesthetic drug in an otherwise calm patient should be viewed with suspicion. The majority of currently employed drugs produce this same general pattern of symptoms. Variations in intensity of action and in sequence of events do occur between individual drugs.

Local anesthetic drugs are eliminated unchanged in the urine or detoxified by the liver and other tissues. Drugs which are slowly destroyed or are eliminated unchanged are more toxic than those which the body readily detoxifies. The ester type of drug is hydrolyzed or converted into the acid and alcohol which compose it. Certain drugs are only partly detoxified and may be recovered in the urine with the detoxified products. Procaine is hydrolyzed to para-amino benzoic acid and diethyl-aminoethanol. Cocaine is partly detoxified but a large portion of a given dose is recovered unchanged in the urine. Liver damage may affect the ability of an organism to detoxify a drug. Many of the individual variations and susceptibilities may be explained by this fact.

Central nervous system stimulation is antagonized by such depressants as chloral, paraldehyde, tribromethanol, and barbiturates. Although this fact was elucidated many years ago by Tatum and his associates, clinicians are now realizing the value of this antagonism in prevention of reactions. Barbiturates are superior to other depressants. The short-acting barbiturates are more effective than the long. The order of their decreasing efficiency is ordinarily given as "seconal," "nembutal," "amytal," phenobarbital, and barbital. Obviously, this antagonism is pharmacological and not chemical and counteracts only the stimulation of the nervous system and not the depression or the effects on the heart or blood vessels. Accidental intravenous administration or overdosage from rapid absorption are best treated by using intravenous barbiturate, preferably a short-acting one such as "pentothal." Artificial respiration with an adequate airway to insure satisfactory pulmonary exchange is also necessary. If the patient has passed into the paralytic phase, the barbiturate is of no value and should be withheld. The use of stimulants, likewise, is not advised as they behave like the local anesthetics, stimulate first, and then depress and would therefore contribute further to the depression. The prophylactic use of the barbiturate does not insure against a "reaction" but will minimize or modify it, should it occur. In any event, prevention is safer than cure. One should observe the following precautions: Use the least possible amount of the weakest solution available. Use the least toxic drug. Attempt aspiration before injection to insure against intravascular injection. Epinephrine should always be employed when infiltrating highly vascular areas.

DISCUSSION (*Abstract*)

Dr. Russell F. Bonham, Houston, Texas.—Dr. Adriani mentioned the use of epinephrine in these drugs. One of our doctor friends in Houston had a little cold, and nose and throat trouble. He went over to see a nose and throat man for a little treatment. While he was spraying his nose with a shrinkage solution containing

epinephrine, this doctor fell over dead. The death certificate read "coronary occlusion."

I would like for Dr. Adriani to tell us what he thinks of the contraindication for epinephrine in coronary cases.

Dr. Fred E. Woodson, Tulsa, Okla.—At times there have been some rather serious reactions from these drugs that some of us have experienced, and on occasion sudden death. I want to ask Dr. Adriani this question, whether they have done any work in predetermining the sensitivity by intradermal tests of solutions of various topical local anesthetics or drugs used for so-called spinal or subarachnoid anesthesia.

We have tested some patients in this manner, and I have not felt that what we have done has been entirely satisfactory, but we have found some patients who got very large areas of erythema, by giving intradermal injections of the solution of the drug. Those were omitted from that type of anesthesia.

Dr. Adriani (closing).—Dr. Bonham of course refers to the first type of reaction, the one due to idiosyncrasy. I said we know little about the idiosyncratic type. His story is complicated by the fact that the individual had a diseased heart.

We know epinephrine increases the irritability of the heart. We also know that local anesthetic drugs are cardiac depressants. It is hard to say what the two acting together might have done to the heart in this case.

I avoid the use of epinephrine in solutions of local anesthetic drugs, because the stimulation caused by epinephrine is often confused with the prodromal signs of a toxic reaction.

In answer to Dr. Woodson's question regarding the use of tests: some pharmacologists feel that the intradermal test is worthless. I feel if one encounters a patient with a positive test, it is well to avoid the use of the drug in him.

I have had a number of patients who have shown a positive intradermal test. It was interesting to note that they were sensitive to "pontocaine," procaine, and other drugs of the group derived from para-amino benzoic acid.

When they were tested with "nupercaine," which is in a different chemical series, or cocaine or "metycaine," which also are in different series, they were not sensitive.

Some have proposed the use of a different test. Four or five drops of the solution to be employed are dropped into the nostril of the patient in the recumbent position. Blood pressure and pulse are observed for a period of twenty minutes.

If there is marked change in the heart rate or the blood pressure, it is an indication that the patient may respond in an unfavorable manner to the drug.

CHOICE OF ANESTHETIC IN UROLOGICAL SURGERY*

By ALFRED HABEEB, M.D.†
Fairfield, Alabama

In spite of the fact that the urological surgeon, in the large majority of his cases, is faced with the problem of operating upon an elderly individual, and that most of these patients present complicating pathology, such as cardio-renal disease, hypertension, diabetes, and a low renal function, it must be granted that tremendous improvement in mortality and morbidity figures has been made in recent years.

Every credit should be given the urologists for the development of improved methods in the preparation of these individuals for surgery, as well as for improved technics for their protection during the actual surgical procedure.

By no means the least of these advances is due to the realization on the part of the urologist that on the anesthesia administered to these elderly patients may depend the outcome, and his willingness to place this responsibility in the hands of the trained physician anesthetist, when such a man is available.

In choosing an anesthetic agent, many factors must be carefully considered, such as the age of the patient, all facts revealed by most careful physical examination, the laboratory reports, etc., for it is important that we fit the anesthetic to the patient and not the patient to the anesthetic. The anesthetic agent chosen should be one that carries with it the greatest degree of immediate safety, as well as one known to do the least damage to the vital organs at the time of operation and in the postoperative period. Also, the anesthetic agent chosen should provide the surgeon with the most suitable conditions for his technical procedure. It is our considered opinion that spinal anesthesia meets these requirements far more completely than any other method for the major operations in urological surgery. We believe that sodium "pentothal" is

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†Department of Anesthesiology, Employees' Hospital.

suitable for the minor operations, and cyclopropane for certain emergencies.

It is an admitted fact that muscle relaxation is tremendously important to the surgeon from the technical standpoint; also that complete muscle relaxation tends to save an immense amount of most valuable time. Safe muscle relaxation can be obtained only under spinal anesthesia, and we believe that this is the real reason for the marked drift away from inhalation anesthesia. In our practice at the Employees' Hospital, as well as in our private work in Birmingham, spinal anesthesia has been the choice for all of these major surgical cases. We are in entire accord with Frank Lahey[1] that only physicians trained and skilled in spinal anesthesia should administer this anesthetic, for it is they who understand the behavior of the anesthetic and are equipped to meet any emergency that may arise.

The time element influence by complete relaxation should be further emphasized. Waters[2] and his associates find the incidence of complications to range from 2.9 per cent in the operations lasting one-half hour, gradually increasing in successive stages until it reaches 30 per cent in operations lasting three to three and one-half hours. Rovenstine[3] states that complications double in operations lasting one hour over those lasting one-half hour. Pilcher[4] finds that the loss of blood during a prostatic resection falls over 30 per cent when the operative time is reduced 20 per cent.

The accepted fact that no drug damage from spinal anesthetic agents to parenchymatous tissue, the brain, liver, kidneys, heart, and suprarenals, is of tremendous importance in shortening the convalescence period and influencing recovery. When one considers that most other anesthetic agents must be eliminated from the body by organs already seriously involved, the importance of the above is evident. Maxson[5] claims that spinal anesthesia does not add to any existing toxemia, that it causes no albuminuria and no glycosuria. Babcock[6] says that in diabetes, in toxemia, in severe infection, or in any condition where metabolic and protoplasmic damage from the anesthetic is a serious factor in the operation, spinal should be considered. Woodbridge[7] says that spinal anesthesia not only has a negligible effect upon the kidneys, but occasionally may even be beneficial. The functional activity of the kidneys under ether anesthesia is depressed. There is a marked decrease in the urine output for a period of twenty-four to forty-eight hours after operation. Chloroform anesthesia is even more harmful. There is some debate as to the effect of sodium "pentothal" on the renal function.

PREMEDICATION

Premedication should be considered as part of the actual anesthesia. A cool, calm and collected patient at the time of operation may make all the difference between success and failure, and such a patient will require less of the anesthetic agent. Seeley and associates[8] in their studies of traumatic shock in animals under certain anesthetic agents observe that the administration of a barbiturate delays very definitely the onset of shock and death in these animals. They say that morphine is not so effective when used alone as when used combined with atrophine and scopolamine. In these experimental studies shock was produced by intestinal manipulation and exposure under various anesthetics.

It is well known that the aged individual will tolerate less premedication than the young and robust individual. Other factors, however, should be considered, such as weight, activity, muscle tone, and whether or not pain is present. It is our practice in the ordinary patient over sixty-five who is to have a prostatic resection, to administer "pantopon," grains 1/6, and scopolamine, grains 1/200, one and one-half hour prior to operation, and a "nembutal" suppository, grains 2, forty-five minutes before operation. The younger individual receives "pantopon," grains 1/3, and scopolamine, grains 1/150, and a "nembutal" suppository, grains 2 or 3, the administration time being the same. We prefer to administer barbiturates by rectum in cases to be subjected to kidney surgery and in those operations in which the peritoneal cavity is to be entered. We believe that a barbiturate serves as an antidote to the anesthetic agents used in spinal anesthesia; also, we believe that rectal administration saves the administration of water by mouth, which frequently increases the incidence of nausea and vomiting.

In those individuals suffering from senile psy-

chosis or from mental confusion due to various toxic conditions, scopolamine should not be given, atropine being substituted. In those individuals who are to receive sodium "pentothal," our premedication consists of "pantopon," grains 1/3, and atropine, grains 1/150 (for the average adult), given forty-five minutes before operation.

The preparation of the patient for operation is very important. Not only is it important for the duration of the operation, but also for a better and smoother convalescence period. Since many of our urological cases represent patients with a hypertension, we recommend giving these individuals, several days before the operation, one of the vasodilatory drugs, namely, aminophyllin, theominal, nitranitol plain, or nitranitol with phenobarbital. These drugs will help to strengthen the heart and stabilize the blood pressure.

Experimentally, it has been shown that these drugs have a dilatory affect on the coronary vessels, and at the same time increase the blood flow through the kidneys, with a consequent increase in the urine flow. In many cases an internist will prepare these patients for operation, and he will, no doubt, administer this therapy. However, it behooves the urological surgeon to be certain of this treatment. To those patients that we consider poor risks for surgery, we administer 3 to 5 c. c. of adrenal cortex one hour to thirty minutes before the operation, and it may be given as often as deemed necessary. This drug may be given intravenously or intramuscularly. Several doses before the operation and after the operation will greatly improve the condition of the patient. This drug will increase the resistance of the patient which helps to overcome the usual shock that goes with any operation. Reed[9] has shown that a patient with adrenal cortical insufficiency reveals a blood picture of lowered chlorides, with an increase of non-protein nitrogen. This picture has been shown by Crile[10] and his associates to be the same as that of a patient in surgical shock. Citrated blood should also be available for those technically difficult operations, such as hypernephroma, where considerable loss of blood is anticipated.

During the period on the operating table, as well as the first twenty-four to forty-eight hours postoperatively, we use and recommend 5 per cent glucose in distilled water. The emphasis is placed on the distilled water. Coller[11] and his associates have recently called attention to the fact that some surgical patients have "salt intolerance." They say that while some patients are capable of tolerating large amounts of isotonic saline solution, others are incapable of tolerating small amounts of salt after an anesthetic, exhibiting such clinical manifestations as nausea, vomiting, distention, fever, decreased output of urine, and increased nonprotein nitrogen in the blood.

Regardless of the anatomical position of our surgery, that is, whether in the transurethral, suprapubic or lumbar regions, spinal anesthesia is our choice anesthetic agent. This has proven to be the ideal choice in the transurethral prostatic resections. As we have shown, these patients represent a group (elderly) with definite pathological conditions. A low saddle spinal anesthesia will maintain as nearly normal as possible the physiology of the circulatory and respiratory systems. The blood pressure will experience only a negligible drop. In our series of prostatic resections, we found that it was necessary to administer a vasoconstrictor drug in 20 per cent of the cases. This figure would be much lower if we allowed pressure to drop very markedly before administering a vasoconstrictor drug. It is accepted by all authorities that the chief reason for the drop in blood pressure comes as a result of splanchnic dilatation. Peripheral vasoconstrictors are knocked out, so to speak. Under saddle spinal anesthesia this dilatation is negligible. Maintaining the blood pressure at normal in these elderly individuals is very important, for their tolerance to variations in blood pressure is small. Scott[12] finds that postoperative complications are much higher in those individuals who demonstrate a very sensitive pressure at the time of operation. By sensitive pressure we mean one that varies from one extreme to the other within a few minutes, as, for instance, a patient with a blood pressure at time of operation reading 170, but which soon falls to 90, and when a vasoconstrictor drug is administered shoots to 200, but soon drops to 90 again. Low pressure produces anoxemia of the tissue, with damage to the brain, liver and the kidneys, with an increased blood

sugar. A patient under spinal anesthesia must be watched very closely and the pressure checked every few minutes. Mask oxygen proves to be one of the best drugs in controlling pressure. If, for example, a normal pressure of 170 drops to 140, the administration of 100 per cent oxygen for a few minutes will, in most cases, hold this pressure and gradually increase it ten or more points, at the same time also increasing the ventilation of the lung tissue.

If oxygen fails to stabilize the pressure, we next resort to one of the vasoconstrictor drugs. In our hands, "neosynephrin" and ephedrin serve this purpose very well. Most of you have experienced a sudden abnormal increase in pressure as a result of a vasoconstrictor drug. You must remember that you are dealing with patients who have a very sensitive circulatory system. To prevent such sudden elevation, a small amount of the drug should be used, but, more important, one should commence to treat this dropping blood pressure before it has reached a low mark. We usually administer 3 to 5 minims of "neosynephrin," intramuscularly. This dosage may be repeated, if necessary, within ten minutes; sooner, if required. If one waits until the pressure is markedly low, the circulation will be too poor to pick up the drug from the tissue. In the sudden and seriously acute pressure drops, we give 1 minim of "neosynephrin," intravenously. In all major cases, 1,000 c. c. of 5 per cent glucose in distilled water is administered at the beginning of the operation. This makes for a ready and waiting vein in case of an emergency.

The average dose of "pontocaine" solution used intraspinally in our series of prostatic resections was 8.5 mg., with the addition of 1 c. c. of 10 per cent glucose to make a hypertonic solution. The height of anesthesia aimed for is thoracic twelve, about two fingers below the umbilicus. This height is necessary in order to knock out the uncomfortable reflexes from a distended bladder. The third or fourth lumbar interspace may be chosen for the puncture. In our series of cases, the third lumbar was chosen more often. The average age in our prostatic series was sixty-four, the youngest being fifty, and the oldest eighty-four. The average time required was fifty-seven minutes, and the average blood pressure before operation was 158. "Pontocaine" solution will last from one hour to one and one-half hours. When it is necessary for the operation to last longer, and the anesthesia wears off, we find a 2.5 per cent solution of sodium "pentothal" to be the ideal supplemental agent. We inject a few c. c. of this solution into the rubber tubing of the glucose near the needle, and this will shade the patient for a period of ten to fifteen minutes. This amount may be repeated, if necessary. We try to have these patients awake when they return to their rooms, this being important in order that they carry on normal respiratory excursions, which help to prevent hypostatic pneumonia and atelectasis. All operations in the transurethral region may be performed under saddle spinal anesthesia, including such procedures as operations on the urethra and scrotum. In suprapubic surgery and surgery on the lower ureter, spinal anesthesia should reach the umbilicus or a shade above. From 10 to 12 mg. of pontocaine in glucose will be sufficient to obtain this height of anesthesia. Patients undergoing suprapubic prostatectomy will experience more shock than those who undergo a transurethral operation, for loss of blood and surgical trauma is much greater; consequently these patients should be guarded more closely, and blood for transfusion should be available at the time of operation.

In surgery on the kidneys and upper ureters, spinal anesthesia must reach the xiphoid. Fifteen mg. of "pontocaine" spinal with 2.5 c. c. of 10 per cent glucose will suffice. We agree with those men who claim that under spinal anesthesia alone the patient will experience some pulling and traction against the ribs and diaphragm, not to mention the discomfort from the usual kidney position. To eliminate this discomfort, we supplement the spinal with either sodium "pentothal" or cyclopropane, preferring sodium "pentothal." We follow this technic: After the lumbar puncture has been done, the patient is placed on his back in an eight degree Trendelenburg position. We test the abdomen every few seconds until the desired height of anesthesia has been reached, which usually takes about five minutes. This patient is then placed in the kidney position. It is important, since we are using a hypertonic solution, to have the shoulders and head elevated on pillows for the first fifteen to twenty minutes after the

spinal has been given, for this time is required for the solution to become fixed to nerve tissue. We next administer 1,000 c. c. of 5 per cent glucose in distilled water. While this is being done, the surgeon has prepared and draped his field and commenced the operation. (It is important that when the patient under an anesthetic is ready for draping and surgery, the surgeon be gloved and gowned. The anesthesiologist should know this in advance and not begin the administration until the surgeon is ready. These lost moments are precious to the surgeon and to the anesthesiologist, but more so to the diseased patient). When the renal fossa is reached, we are ready to give our supplement, sodium "pentothal." To keep the patient shaded over will require a few c. c. at a time. The patient is kept under very light anesthesia; truly it is more of an analgesia. This type of surgery gives one the maximum relaxation and the minimum of sodium "pentothal." The patient has experienced no ill effects.

Many of you are doing kidney surgery under sodium "pentothal." We cannot altogether agree with this choice, for we believe that spinal anesthesia, supplemented with sodium "pentothal" or cyclopropane, meets the physiological requirements more adequately, and most certainly affords a maximum relaxation. There have been conflicting and confusing reports as to the part the liver and kidneys play in the elimination of this barbiturate from the body. Adams[13] believes that sodium "pentothal" is broken down in the liver and that the end products are excreted by the kidneys. Thomas[14] claims that sodium "pentothal" does not affect the normal kidney, nor is there any functional deficiency aggravated by "pentothal." Lundy[15] says that sodium "pentothal" may be used for kidney operations if the operation is to be of short duration and the patient not robust. Since we find that there is a questionable risk in the complete use of "pentothal," we never take the risk. However, we highly recommend its use in the short procedures and as a supplement for spinal anesthesia. In safe doses, sodium "pentothal" will not obliterate the abdominal reflexes. Cyclopropane gas in the face of kidney disease and impaired function is more suitable as a sole agent. Phelps and Burdick[16] claim that cyclopropane causes only slight suppression of urine during its administration and has no other known effect upon the renal function. However, this gas is highly explosive and every precaution must be observed. Its use is contraindicated in the presence of cardiac irregularity or decompensation.

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DISCUSSION (*Abstract*)

Dr. William R. Miner, Covington, Ky.—Probably the greatest satisfaction that a surgeon can have during an operation is in the knowledge that at the head of the operating table is an experienced physician anesthetist who is as much interested in the welfare of the patient as the surgeon himself, an anesthetist who gives intravenous glucose, plasma, whole blood, or any type of therapy when indicated, without asking for the opinion of the surgeon, an anesthetist who understands what the surgeon is doing at all times, and increases or decreases the anesthetic as indicated.

We heartily agree with Dr. Habeeb that spinal anesthesia meets the requirement of a satisfactory anesthetic far more completely in major urological operations than any other known anesthetic.

We believe that this is especially true in the use of continuous or fractional spinal anesthesia because it can be controlled during the operation.

For continuous spinal anesthesia, usually our anesthetists give a barbiturate and a narcotic without the addition of atropine preoperatively. Ephedrine sulphate is injected subcutaneously just before the spinal tap is made. Ten c. c. of spinal fluid is aspirated and 500 mg. of procaine crystals are dissolved in it, thus giving a procaine content of 50 mg. per c. c. of spinal fluid solvent. The procaine solution is then slowly injected into the spinal canal until the desired level of

anesthesia is reached. If the anesthesia extends to a higher level than is needed, enough of the solution is aspirated from the spinal canal to bring the anesthesia down to the proper level, which it usually does in about five minutes.

Approximately 300 mg. of procaine crystals are used for the average kidney operation; however, as much as 700 mg. have been used for one operation without any deleterious effects. If the patient experiences pain at any time during the operation, an additional c. c. of procaine solution is injected, which usually relieves the patient in about forty-five seconds. During the operation the position of the patient may be safely changed at any time, either lowering or elevating the head of the operating table.

If at the end of the operation the anesthetist wishes to remove most of the anesthetic agent, he withdraws several c. c. of the spinal fluid. In about five minutes the patient begins to experience pain and can usually move his limbs. Naturally, a narcotic is immediately indicated.

Our anesthetists have been using continuous spinals or fractional anesthesia for the past four years, and we are of the opinion that it is the safest and most satisfactory anesthetic that can be used in major urological operations.

Dr. H. K. Turley, Memphis, Tenn.—I have been doing all of my transurethral surgery under spinal anesthesia and have abandoned the use of vaso-constrictive drugs before and during the operation. They frequently cause unusual elevation of blood pressure which in turn may result in severe bleeding that is difficult to control.

Even after the patient has been returned to his room, the oozing may continue, resulting in collection of blood clots which produce further active bleeding.

Where there is a drop in blood pressure after the administration of the spinal anesthetic, I routinely use intravenous glucose which will gradually return the blood pressure curve to the preoperative level by the time the operation is completed. And there is less danger of clot formation afterwards.

We have many good safe anesthetic agents, such as sodium "pentothal" for short operations and for very nervous patients.

For young children, I prefer inhalation ether.

Dr. Habeeb (closing).—We have not used continuous spinal in our kidney work but agree with Dr. Miner that it would serve the purpose in the long drawn-out cases. We find that the relaxation obtained from the one injection of "pontocaine" lasts two hours or more. And since there are very few kidney operations that last any longer than this we have not used the continuous spinal technic.

Dr. Turley called our attention to a very important point, that is, the controlling of the blood pressure during the operation. Serious results may occur if the blood pressure is elevated to 200 or above. Not only can a cerebral accident take place but also the considerable bleeding which occurs during an abnormal elevation of the blood pressure can prove troublesome. In order to maintain blood pressure as nearly normal as possible one should check the pressure at least every five minutes. In using a vaso-constrictor drug one should be sure of the patient's blood pressure reading. In the paper I did not mention anesthesia in children. In many of these cases, even in the face of a kidney involvement, ether anesthesia is the stand-by. However, we recommend that these individuals be kept under a light anesthesia and a continuous nasal oxygen should be administered during the operation. We have used from one to two per cent sodium "pentothal" solution in children for minor procedures, such as cystoscopic or drainage of a perinephritic abscess.

EXPERIENCE WITH RECTAL "PENTOTHAL" SODIUM IN OBSTETRICS*

By GERHART R. TONN, M.D.†
Wichita, Kansas

Since the introduction of anesthesia into obstetrical practice by Sir James Y. Simpson, much opposition has been encountered as to the advisability of the use of any agent to decrease the discomfort of the mother during her labor. However, in recent times all intelligent women demand to be spared the suffering and pains of childbirth. In spite of all of the advances made, the ideal agent has not yet been discovered.

To be ideal, an analgesic agent should be applicable at any time during every type of labor. According to Stander,[1] it should not interfere with the normal mechanism of labor and the number, duration, and quality of uterine contractions should be unaltered. The patient should not be rendered unconscious as her cooperation is frequently desirable. The method used should be absolutely safe to both mother and child, and, I might add, should be simple to give and to control in this day of high service demand and physician shortage.

In a review on the present status of obstetrical anesthesia, presented by Kotz and Kaufman,[2]

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†We wish to give full credit and thanks to the Wesley Hospital Department of Obstetrics and the generous aid and wise counsel given by Robert Maxwell, M.D., George Cowles, M.D., Ray West, M.D., Bruce Meeker, M.D., E. C. Rainey, M.D., Dan B. Arst, M.D., and many others of the Staff of Wesley Hospital of Wichita, Kansas.

the statement was made that "pentothal" sodium, because of rapidity of action, is especially suitable, used by rectum, for multipara who come to the hospital in active labor. They reported that in 60 deliveries, uterine contractures apparently were not diminished and none of the babies was affected. They stated that the dosage was 1 gram per 50 pounds body weight, but some variation was allowable. With this information, we were stimulated to observation in the use of this drug, and carefully worked out a series of 100 deliveries.

"Pentothal" sodium is now a well known and often used drug in the field of anesthesia.[3] The pharmacological action has not been determined completely. It was formerly thought that it was especially contraindicated in patients with cirrhosis of the liver, jaundice, shock, hypertension, asthma, pulmonary disease and marked debilitation. However, Weinstein and Light,[4] working in Chicago with the drug as a basal anesthetic and giving it rectally, have shown that these were not necessarily contraindications. Scheifley and Higgins[5] conducted studies showing that "pentothal" sodium resists destruction by the liver, and Richards and Appel[6] proved that liver damage does not prolong sleep after injection of "pentothal" sodium. Stridor is quite rare in the uses of "pentothal" sodium rectally. Weinstein and Light say that "pentothal" sodium is unquestionably the safest barbiturate we now have and because of slow absorption, rectal administration is probably more safe than intravenous. They used "pentothal" sodium rectally in 30 obstetrical cases with no ill effects on the baby, no cessation of labor pains, no delirium, but with prompt sedation followed by rapid dilatation of the cervix.

We used a dosage of 1 gram per 50 pounds body weight, and found that very little variation from this dosage was necessary. The dosage necessary for continued anesthesia was found to be about 1 gram given about 1½ hours after the primary instillation, and repeated again when necessary. A labor of long duration, however, did not give satisfactory results, since some physiological difficulties were encountered.

To develop the greatest similarity of use in each patient and the most accurate evidence, a definite procedure was decided upon. Although not entirely accurate, it was decided that we would have to take the patient's word for the time of beginning of labor. This was recorded. When the patient was admitted to the hospital she was examined and sent into the preparations room. Her history was taken and a careful physical examination was made, including a rectal. The information obtained was recorded and the nurse was instructed in the primary preparations. This consisted of a scrub and shave and a good cleansing saline enema. Saline was used since we discovered early that soap suds seemed to destroy the drug. The enema is not necessary before administration of "pentothal" but it is always a desired procedure for the obstetrical patient. After the enema had been completely expelled, the patient was watched until rectal examination indicated the proper dilatation and effacement for the drug administration.

The patients all knew their weights since recent visits to their physician had resulted in a careful check up and weighing. Then the required dose of "pentothal" was prepared and mixed with ½ ounce of water for every two grams used. This small amount was used since it did not produce an enema effect. The water and the "pentothal" were mixed by gentle stirring. A size 12 to 18 French catheter was then lubricated and inserted into the patient's rectum for about 6 to 8 inches distance and while the patient was lying on her left side. The "pentothal" was injected with a syringe and the catheter was quickly removed. A sanitary napkin was then placed over the rectum and gentle but firm pressure was applied. A blood pressure reading was taken at this time and recorded. Usually within 2 to 5 minutes the patient would say that her arms and legs were tingling as if they were going to sleep. In from 10 to 20 minutes, the patient was in a stuporous sleep from which a uterine contracture aroused her only slightly. The rate of respiration did not change; however, the depth was decreased very slightly. The blood pressure in nearly all cases rose from 5 to 15 points systolic, with no noticeable change diastolic. The pulse invariably increased 8 to 16 per minute with the blood pressure rise. There was no change in the fetal heart rate or in the fetal heart intensity. At no time were the

uterine contractions increased in interval or decreased in duration. Soon after administration, it appeared that the interval between contractions decreased and the duration of each contracture increased.

It was felt throughout the observation that the length of the first stage of labor was considerably shortened. At the end of the series a close check was made with 100 cases chosen at random from the Wesley Hospital record room. These cases had been given either "nembutal," "seconal" with scopolamine, "sigmodol" or paraldehyde during the first stage of labor, and in some cases this had been supplemented with ether, chloroform, or nitrous oxide. Comparison of the length of the first stage of these cases with those given "pentothal" sodium, revealed a shortening of labor of 1 hour and 37 minutes in primipara and a decrease of 1 hour and 11 minutes in multipara. This shortening of the labor time is, of course, of definite advantage, both to the mother and the child.

During the second stage of labor it was necessary to give some added inhalation anesthesia in about 40 per cent of the cases during the uterine contracture. It is surprising to note, however, that the patients helped when asked to, by the obstetrician, and in this way made the delivery more satisfactory than those patients who were given other barbiturates. The pelvic floor was relaxed and at no time was it felt that forceps must be used to help the mother because of loss of contracture intensity. Much less inhalation anesthetic was needed for the episiotomy on the patient given "pentothal" in comparison with those given other drugs.

The child at birth showed no evidence of respiratory depression or deep cyanosis, which is frequently seen with other methods. The supervising obstetricians felt that no more difficulty in breathing was encountered with "pentothal" than without the use of any anesthetic agent. Respiratory depression occurred in patients who were given repeated doses of "pentothal" because of a prolonged first stage of labor. For this reason primarily, it was felt that a certain percentage of primiparas should be excluded from the use of "pentothal," and this percentage was finally considered to be from 30 to 35.

During the third stage of labor we found no case of prolonged hemorrhage or retention of the placenta. The uterus contracted quickly and with the routine use of ergotrate, pituitrin and carefully regulated massage, the blood loss to the mother was maintained at the minimum. During the repair, the patient required much less inhalation anesthetic to keep her in complete relaxation. No cases of shock resulted in this series.

After the mother had been returned to her room, she usually reached full consciousness in from 30 minutes to two hours, depending on the amount of inhalation anesthetic used. Upon awakening, the mother was shown her child and frequently conversed at length with the husband or some member of the family. No cases of prolonged sleep were encountered in the normal labors. However, four were prolonged to 6 and 7 hours, and again numerous repeated doses of "pentothal" had been given to these patients because of a prolonged first stage of labor. With the use of other barbiturates such as "nembutal," "seconal," and with the use of "sigmodol" and paraldehyde, the patient slept from 2 to 24 hours after delivery and then suffered from stupor and headaches or a typical hangover. Only on two occasions was this feeling of a hangover encountered with the use of "pentothal" and then prolonged labor called for often repeated doses.

In ten cases of prolonged labor, pentobarbiturates were first given and later, "pentothal" was administered. This produced both difficulty in respiration of the baby, and prolonged recovery periods in nearly all cases. We concluded that a mixed agent is contraindicated, and in our series of 100 cases, "pentothal" sodium was used without the aid of other barbiturates.

Observation led us to believe that the drug should not be administered until the cervix had dilated 2 to 3 cm. in multipara and from 3 to 4 cm. in primipara. A hard, slowly effacing cervix often points to a prolonged first stage and therefore is a contraindication to the use of "pentothal" sodium. Since this rule was not violated we felt that we had 98 per cent good results in multipara and about 75 per cent good results in primipara. We defined a good result,

as complete amnesia of pain during labor, complete consciousness before 2½ hours after delivery, a pink, crying baby and a quiet, cooperative patient.

Since this series, it has been called to my attention that patients who use either alcohol or barbiturates in excess, seldom have good results with the use of "pentothal." We felt that the multipara was probably the best and safest patient for the use of "pentothal" and that the primiparas should be selected carefully before administration. The primipara with malposition must be considered a risk with "pentothal." Although we did not encounter a patient with severe involvement of the trachea, edema of the glottis, or other conditions of respiratory embarrassment, we feel that in these cases "pentothal" should not be used. Even though seldom encountered in obstetrics, we feel that a severe anemia is a contraindication for the use of "pentothal." "Pentothal" sodium should not be used with "nembutal," "seconal," "sigmodol" or paraldehyde if the best results are expected from its use. The use of nitrous oxide or ether is highly recommended during the second stage and in the perineal repair.

The favorable reasons for the use of "pentothal" might be listed as follows:

(1) The drug is easily given and a nursing staff can easily be trained in its use.

(2) The patient is usually more quiet and less apprehensive with "pentothal" than with the other barbiturates and repeated dosage does not increase body movements or stimulate the patient to restlessness.

(3) The time of the first stage of labor is decreased with "pentothal" in comparison with other barbiturates or without any anesthesia.

(4) Much less inhalation anesthesia was needed and induction with ether or nitrous oxide is smooth and simple.

(5) The patient awakens more quickly after delivery and the feeling of a "hangover" does not seem to follow the use of "pentothal."

(6) The child was nearly always pink and little respiratory difficulty was encountered. No ill effects on the baby could be traced to the carefully administered, thoughtful use of "pentothal."

(7) The patient responded more rapidly to anesthesia before and during perineal repair.

(8) Total amnesia was the rule and rarely did the patient remember anything from the time shortly after administration, until after arriving in her room.

(9) Excessive dosage does not stimulate the patient as is frequently seen with the use of other barbiturates and "pentothal" offers a greater margin of safety to both mother and child.

(10) We found no extra tendency to hemorrhage or relaxation of the uterus and there was no tendency toward placenta retention.

(11) The physiological make-up of the patient is very little changed by the administration of "pentothal" sodium rectally.

(12) Multipara stated that the drug was far superior to the drugs used in previous deliveries.

(13) Oxygen, metrazol and picrotoxin are considered excellent antidotes in case of difficulty.

In conclusion then, I have presented the observations on the use of "pentothal" sodium in 100 obstetrical cases. I have added observations on several cases in which "pentothal" was used rectally with other drugs. We feel that "pentothal" is the least dangerous of all the barbiturates in normal labor, but that there are definite contraindications for its use. "Pentothal" sodium rectally is not a fool proof drug to be used in all obstetrical cases, and must be used intelligently and on selected patients. The patient is well pleased with its use, but much more experience is needed and much more work needs to be done to find a drug which will finally meet all the requirements previously given for an ideal analgesic agent. "Pentothal," will be used more and more as a rectal anesthesia in obstetrics, and will spare many women suffering and pain in childbirth.

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DISCUSSION (*Abstract*)

Dr. Norris E. Lenahan, Columbus, Ohio.—The use of rectal "pentothal" in obstetrics is a very important contribution in the production of amnesia. This method should be tried extensively and statistics built up either to prove or disapprove this very enthusiastic paper. This method certainly would be much simpler to use than continuous caudal analgesia and the old quinetherol of Gwathmey.

We have never used rectal "pentothal" in obstetrics; however, we have used rectal "pentothal" in children from two months to eight or ten years. We will certainly give this method a trial.

We have been using "pentothal" intravenously for cesarean sections, and I am enthusiastic about it.

Dr. J. M. Weldon, Mobile, Ala.—I have had no experience with "pentothal" rectally, and am delighted to hear of the good results. For the benefit of those of you who have not had experience with it intravenously, it definitely has a bad effect on the baby.

In our sections we have used one of the gas anesthesias, cyclopropane, until the baby is delivered and the cord is severed, and then we switch to "pentothal." It works very nicely. Intravenously for sections "pentothal" has a definite effect on the baby, producing anoxemia. It makes resuscitation quite difficult and sometimes impossible.

Dr. Tonn (closing).—This form of anesthesia, I know, is not so familiar as some others. The thing that has stimulated me particularly in using it, was that I could not see why so many babies should be born blue with mouth to mouth respiration needed, and numerous other things which I felt were definitely harmful to both the mother and child, because of the use of other barbiturates.

In Wichita women demand some form of help so they do not have to suffer through labor. That stimulated us to this review. You will not learn from using this method once or twice.

As to intravenous "pentothal" in cesarean sections, I have seen about ten cases, and I cannot be very enthusiastic in its use. In three we employed it rectally, as it was used by Weinstein and Light, as a basal anesthesia and we found it quite satisfactory, although it is not a perfect drug.

I am not advocating this as a perfect drug; in fact, it is far from it. I believe it is one of the safest that has thus far been found. Naturally blue babies do still result. They result without any anesthesia. It is probably a vicious habit, but some men are still using pentobarbiturate and other barbiturates, perhaps, in excessive doses, and these produce the blue babies.

I cannot feel that intravenous "pentothal" is so effective as rectal "pentothal" in normal labor.

THE TWO-HOUR PREGNANCY TEST*

By HERBERT S. KUPPERMAN, Ph.D.
and
ROBERT B. GREENBLATT, M.D.
Augusta, Georgia

Pregnancy tests are assuming a position of ever increasing importance as a major diagnostic biologic procedure. They enable the clinician to determine accurately the presence of the products of conception. The number of tests suggested has been large and a great variety of animals, ranging from protozoa to the pregnant human herself, have been employed as the test object.[1] The biologic principles of the various tests that have been employed have a common origin and are based upon the observations noted by Aschheim and Zondek[2] in 1928, that gonad-stimulating substances appear early in the urine of the human female shortly after implantation of the fertilized ovum. They observed that parenteral administration of urine from pregnant women to immature female mice was followed by precocious development of the gonads characterized by follicle ripening and induction of vaginal estrus, hyperemia of the ovary and formation of corpora hemorrhagica. Utilizing their experimental findings, Aschheim and Zondek[3] suggested the first biologic test for pregnancy permitting its early and accurate diagnosis prior to the establishment of adequate physical signs. Their original lengthy procedure was improved upon and altered by many investigators so that at the present the most widely used test for pregnancy is the Friedman[4] modification employing the isolated female rabbit as the test animal and requiring 48 hours for completion. The high degree of accuracy of the Friedman procedure has been responsible for its adoption as the method of choice by most laboratories in this country.

A desire to shorten the procedure still further and to surmount the inconveniences of the rabbit

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*Department of Experimental Medicine, University of Georgia School of Medicine.

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test led to the selection of the immature female rat as a more desirable test animal. Using this rodent it has been demonstrated by various investigators that ovarian hyperemia,[5-12] corpus hemorrhagicum formation[3] and patency of the vaginal orifice[13] following injection of pregnancy urine may be designated as the criteria for a positive pregnancy reaction. Of these end-points ovarian hyperemia yielded the most rapid results. The tests advocating ovarian hyperemia as the positive end-point progressively shortened the time necessary to make a diagnosis with no apparent sacrifice in accuracy. Eberson and Silverberg,[5] using concentrated urine specimens were able to reduce the time required for the test based on hyperemia to 36 hours. Reiprich,[6] by injecting large doses of unconcentrated urine observed hyperemia within 24-30 hours. The Walkers,[7] presenting their own modification, observed that they could reduce the time necessary to make a diagnosis to 30 hours when 1.5 c. c. of unconcentrated urine were administered three times during one day and the animal sacrificed 30 hours after the first injection. Kelso[8] reduced the time necessary to read the test to 24 hours, although he suggested that 72 hours be relied upon to diagnose correctly a case as negative when hyperemia is not observed. Frank and Berman,[9] also depending upon ovarian hyperemia as their end-point, claimed that a correct diagnosis in either positive or negative cases may be attained in 8-24 hours. Salmon et alii[10] curtailed the time necessary to make a diagnosis to six hours and still obtained results comparable to those observed when the rabbit is employed as the test animal. Ramsey et alii,[11] however, using essentially the same technic, recommended 6-24 hours as the time necessary for completion of the test, but got more accurate results when autopsy was delayed until 18-24 hours after the first injection. Kline,[12] upon subcutaneously injecting urine heated to 35° C. and adjusting his administered dose according to the specific gravity of the urine, was able to obtain satisfactory results with the six-hour test.

Utilizing the hyperemic effect of urinary gonadotropins upon the ovary, we have devised a pregnancy test using immature female rats, whereby the time necessary for completion of the test is shortened to two hours.[14] Observations on the applicability of the hyperemic response of the ovaries of rodents other than the rat, to urinary gonadotropins are also presented. In addition, preliminary observations on the effect of various pituitary, urinary and serum hormones upon ovarian hyperemia are discussed.

PROCEDURE

Since the two-hour test is applicable only to the rat, the technic employed in our laboratory with this test animal will be described in detail. In addition a brief resume of the results and doses necessary in other rodents will also be presented.

Test Animal.—Immature female rats,* 21-55 days of age, or 30-80 grams in weight are satisfactory for the test. Immaturity is ascertained by the fact that neither vaginal introitus has been established nor corpus luteum formation has occurred. The latter information cannot be obtained until autopsy of the rat; however, at no time in our colony has corpus luteum formation been observed in animals in which the vaginal membrane had remained intact.

At this point, a word of description of the rat's external urogenital system may be warranted. The female rat has separate orifices for the genital and urinary systems. That of the genital system is rendered impervious by an intact membrane until the time of initial estrus or sexual maturity. Thus by simple macroscopic examination of the intact animal the sexual maturity of the female rat can be readily ascertained.

Dose of Urine and Mode of Administration.—The urine specimen is obtained, preferably from the first morning sample, although the test may be adequately carried out with no sacrifice to accuracy with any sample voided throughout the day. In the latter samples the dose of urine administered is increased somewhat above that employed with the more concentrated specimen. Two c. c. of unconcentrated urine are injected intraperitoneally in divided doses of one c. c. each into the right and left lower abdominal quadrants. Employing a dull needle, the rat is held with its head down so that the intestines will gravitate away from the site of puncture by the needle and thereby escape injury. The

*Albino rats of Wistar or Sprague-Dawley strain.

rat is readily held in the left hand in such a manner that the skin of the abdomen is drawn taut and the injection is easily made by holding the syringe in the right hand. The animal is sacrificed by ether asphyxiation two hours after the intraperitoneal injection or any time thereafter up to 24 hours. Hyperemia of the ovary and ovarian capsule is indicative of a positive reaction. It may be necessary at times to kill an uninjected rat at the same time as the test animal is exposed to distinguish between the normal pale pink picture of the control animal and the rose-red hyperemic appearance of the ovary stimulated by pregnancy urine.

In addition to reporting our results employing the above two-hour procedure we should also like to present our findings on the comparison of the two-hour test with the Friedman modification of the A-Z test and with the six-hour test. Observations on the effect of urinary gonadotropins upon ovarian hyperemia in the hamster, mouse and guinea pig and their applicability as suitable test animals for a diagnostic procedure for pregnancy are presented. The Friedman tests* were carried out on young mature isolated female rabbits. Twenty c. c. of an unconcentrated, filtered sample of a morning specimen of urine were administered intravenously in two equal doses into the marginal ear veins at 24-hour intervals. The animals were sacrificed 48 hours after the first injection and the ovaries were examined for corpora hemorrhagica ("blut punkten"). Samples of the same urine specimen were simultaneously administered to rats for performance of the two-hour tests so that comparison of the accuracy of the two methods could be made.

The six-hour procedure was carried out in rats of the same age and weight as those employed in the two-hour intraperitoneal test. However, in the six-hour test, 2.5 c. c. of urine were administered in one dose in the dorsal subcutaneous area of the rat. The animals were sacrificed by ether asphyxiation six hours after the urine had been injected and the ovaries were examined for evidence of hyperemia.

Immature female hamsters (Cricetus auratus), 25-30 days of age and 40-60 grams in weight were injected with the unknown urine and killed by ether asphyxiation. Both intraperitoneal and subcutaneous injections were made. A total dose of 2 c. c. of urine was administered. Divided doses of urine of 1 c. c. each were administered intraperitoneally into both the right and left lower abdominal quadrants, and the animals were autopsied 2-15 hours after injection.

The immature and adult mice* received a total dose of 0.6 c. c. and 1.5 c. c. respectively. These doses were administered intraperitoneally in equal aliquots into both the right and left lower abdominal quadrant. Both the adult and immature animals were autopsied 2-15 hours after the administration of the urine. Immature female guinea pigs about 150-200 grams in weight were injected subcutaneously with 10 c. c. of pregnancy urine. These animals were autopsied 12-48 hours after the injection. Observations upon both the induction of vaginal introitus and hyperemia of the ovary were made in the guinea pig.

Various extracts of the pituitary gland and gonad-stimulating preparations from the pituitary, serum and urine were also administered to rats to determine the particular hormone responsible for the hyperemic reaction of the ovaries. The extract to be tested was placed in 2 c. c. of an aqueous medium and administered either subcutaneously or intraperitonally. The extracts injected included purified follicle-stimulating preparations, luteinizing hormone, unfractionated pituitary gonadotropins, thyrotrophic and lactogenic hormone, purified gonad-stimulating preparations prepared from pregnant mares' serum and human pregnancy urine.†

RESULTS AND DISCUSSION

In considering the results obtained with the two-hour test, it was observed that a percentage of error in diagnosis was below one per cent. The results are summarized in *Table 1* and show there were no false positives in a series

*We wish to express our appreciation to Mrs. Berta Chandler of the University Hospital Laboratories, Augusta, Georgia, for her kindness in cooperating with this phase of the problem. The Friedman tests were performed under her direction and she kindly made samples of the same urine specimen injected into rabbits available for the two-hour procedure.

*Albino mice, Rockland strain.

†Thyrotropic hormone was kindly furnished by Dr. Fenger of the Armour Laboratories. For their kindness in furnishing us with the remaining purified and unfractionated extracts we wish to express our appreciation to Drs. W. H. McShan and R. K. Meyer of the Department of Zoology, University of Wisconsin, Madison, Wisconsin.

of 363 cases and only four false negatives in a series of 387 cases. In the six-hour rat (subcutaneous) test, performed on a total of 491 cases of which there were 252 pregnant women and 239 non-pregnant women, a correct diagnosis was obtained in all cases. The analysis of the false negative cases observed in the two-hour test showed that in one case the urine was badly infected with B. coli bacilli and an injection of this urine intraperitoneally resulted in diffuse hyperemia of both ovaries and adjacent areas of the body cavity. Inasmuch as the test for pregnancy depends on contrasting the area of hyperemia of the ovary with the lack of hyperemia of adjacent tissue in the body cavity, one could well see why an error resulted. Since the contaminated urine caused a diffuse hyperemia of the peritoneal serous membranes, the normal contrast usually present was not noticeable and the test was erroneously diagnosed as negative. When other samples of infected urine were administered this mistake was not made since experience was gained in reading the ovarian hyperemia without necessarily comparing it to the lack of hyperemia in the body cavity. Analysis of two of the other false negative findings showed that the basis for the incorrect reading could be attributed only to the fact that the urine did not contain a sufficiently high titre of urinary gonadotropins to produce a reaction in the test animal. Repetition of these tests 5-7 days later established the correct diagnosis. These data and other obtained later showed that the earliest day a positive test could be observed was when the patient was at least 21-24 days pregnant, that is, 7-10 days after missing the menstrual period. Another false negative was observed when the diagnosis was based upon the observation seen in one rat only. Apparently this rat, as later data revealed, could be considered as a non-reactor. In the tests performed during the past year an average of two rats was employed. However, we have found that one rat may be used in case of a shortage of animals, and if the test is positive there is no need to repeat the procedure in another rat. When only one rat is used and a negative reading is obtained, it is advisable to re-check the result on another rat. We have found in a series of over 2000 rats that five animals were considered as non-reactive, that is, they failed to show a normal hyperemic response to the urinary gonadotropins.

Simultaneous tests performed on both the rat and the Friedman test were done in a series of 251 cases (*Table 2*). Of these there were 125 pregnant women and 126 specimens from non-pregnant women submitted for diagnosis. The rat test was unequivocally correct in all cases. In the rabbit tests there were five false positive and two false negative cases (*Table 1*). Of these false positives, three were from patients suspected to be in the menopause.

The data obtained from the hamsters, mice and guinea pigs indicate that while the hyperemic effect of the urine noted in the rat may be induced in the hamster and mouse, we failed to produce a perceptible effect in the immature guinea pig. Patency of the vaginal membrane was likewise not observed in the guinea pigs after 48 hours following the administration of 10 c. c. of urine. The guinea pigs also proved unsatisfactory for another reason, namely: they were unable to tolerate satisfactorily the administration of large doses of unpurified pregnancy urine. The results obtained with the use of hamsters and mice indicate that these ani-

RESULTS OBTAINED WITH THE TWO-HOUR (INTRAPERITONEAL) AND SIX-HOUR (SUBCUTANEOUS) TESTS

	Positive Readings				Negative Readings					
	Number of Patients	Number of Rats	Correct Diagnosis	False Positives	Number of Patients	Number of Rats	Correct Diagnosis	False Negatives	Total Number of Patients	Total Number of Rats
Two-hour test	363	605	363	0	389	741	385	4	752	1346
Six-hour test	252	419	252	0	239	509	239	0	491	928

Table 1

COMPARISON OF THE TWO-HOUR RAT TEST WITH THE FRIEDMAN TEST

	Positive Readings			Negative Readings		
	Number of Patients	Correct Diagnosis	False Positives	Number of Patients	Correct Diagnosis	False Negatives
Two-hour test	125	125	0	126	126	0
Friedman test	126	121	5	125	123	2

Table 2

mals do not react as promptly as rats but indicate that when the tests are read in 15 hours a correct diagnosis may be made in 95-98 per cent of the tests performed. Since the results observed with the immature mice were so variable the use of immature animals was deferred and only adult animals exceeding 18-20 grams in weight were employed. The data on these experiments are tabulated in *Table 3*. The one disadvantage in the use of hamsters and mice is that at least three animals should be injected for each sample of urine tested since there is a high percentage of animals, particularly hamsters, that are poor reactors. It is necessary when both the mouse and hamster are employed that control animals be killed simultaneously so that an adequate comparison to a reference standard may be made. The data on the mice and hamsters are presented, not that they offer any advantage over the two-hour rat procedure, but because of academic interest and in the event that rats cannot be procured, hamsters and rats may be resorted to instead.

In considering the mechanism of the hyperemic effect of the urinary gonadotropic hormone upon the ovary, it was of interest to determine whether this response was specific to the urinary gonadotropins. A number of gonadotropic preparations extracted from the pituitary, urine and serum were tested to determine which contained the hyperemic factor. The results are presented in *Table 4* and show that the fractionated and unfractionated gonadotropins containing luteinizing and luteotropin activity were effective in producing hyperemia of the ovary. The pituitary extracts employed were those from sheep, beef and rat and horse material.

THE RESULTS OF THE HYPEREMIC TEST IN ADULT MICE AND IMMATURE HAMSTERS*

	Positive Readings			Negative Readings		
	Number of Patients	Correct Diagnosis	False Positives	Number of Patients	Correct Diagnosis	False Negatives
Adult mice	103	98	5	62	59	3
Immature hamsters	69	65	4	49	47	2

*Animals sacrificed 15 hours after intraperitoneal administration of urine.

Table 3

The results with the fractionated principles showed that the follicle-stimulating hormone (FSH) was ineffective in physiological doses in producing ovarian hyperemia. On the other hand, luteinizing hormone (LH) and lactogenic preparations were strongly hyperemic in action. Purified pregnancy urinary preparations (PU) in addition to purified gonadotropin prepared from pregnant mares' serum (PMS) were equally effective in producing ovarian hyperemia. The thyrotropic hormone did not induce ovarian hyperemia. The doses of FSH, unfractionated pituitary extracts, PU and PMS preparations employed were such that when they were injected subcutaneously into 21-22-day-old female rats in nine equal doses over a period of 4.5 days, at least a 4-5 fold increase in ovarian weight was attained. With respect to the luteinizing and lactogenic preparations suffice it to say that they were active in producing qualitative changes in the rat ovary as determined by corpus luteum formation and maintenance,[15] respectively. Since the LH, PU, PMS and unfractionated rat and sheep pituitary extracts are high in luteinizing and hyperemic activity, while FSH and horse pituitary extracts which are low or deficient in luteinizing properties lacked hyperemia inducing qualities, it

HYPEREMIC RESPONSE OF THE OVARY OF THE IMMATURE RAT TO HORMONE EXTRACTS

Extract	Dose[1]	Hyperemic Response
Follicle stimulating hormone (FSH)	1 gram	Negative
	2 grams	Negative
Luteinizing hormone (LH)	0.5 gram	Positive
	1.0 gram	Positive
Lactogenic hormone I	0.5 gram	Positive (weak)
	1.0 gram	Positive
Lactogenic hormone II	1.0 gram	Positive
Unfractionated gonadotropic extract (sheep)	50 mgm.	Positive
	100 mgm.	Positive
Horse pituitary suspension	5 mgm.	Negative
Thyrotropic hormone (Armour)	10 units[2]	Negative
Purified pregnant mares' serum (PMS)	0.1 mgm.	Positive
	0.25 mgm.	Positive
Purified pregnancy urine (PU)	3 c. c.[3]	Positive
	4 c. c.	Positive

(1) Doses of pituitary preparations expressed in equivalents of dried pituitary glands.
(2) Rowland-Parkes' units.
(3) Equivalent of unconcentrated urine.

Table 4

may be concluded that the LH is essential for the production of ovarian hyperemia. In addition to LH, apparently preparations strong in luteotropin or corpus luteum maintaining activity, as the lactogenic hormone,[15] are likewise capable of producing ovarian hyperemia.

The hyperemic stimulating effect of LH and the absence of this factor in FSH preparations is of more than academic interest. Thus urine from menopausal patients which is rich in FSH will not give a positive test with the two-hour procedure but may be expected to produce a false positive in the Friedman test. The two-hour rat test, theoretically, will not result in false positives unless LH is present. Sufficient quantities of LH are usually present only in urine of pregnancy, or that from patients with hydatidiform mole and chorionepithelioma. From these preliminary investigations it is interesting to speculate concerning the use of the ovarian hyperemic reaction as a rapid and specific procedure for determining the luteinizing or luteotropic content of extracts of questionable activity. Interestingly enough, the hyperemic factor which presumably is allied to the LH or luteotropic hormone, apparently initiates the stage of reactivity of ovarian tissue to hormone stimulation. Microscopic evidence showed an extensive hyperemia of the ovarian tissue in the immature rat two hours after intraperitoneal injection of pregnancy urine. Similarly in adult rats injected subcutaneously with 5 c. c. of pregnant urine the corpora lutea were both macroscopically and microscopically markedly congested after six hours.[14] Instead of the sequence of events suggested by Zondek:[16] that the gonadotropic reactions of the ovary may be classed as reaction I, follicle ripening; as reaction II, hyperemia of the ovary; as reaction III, formation of corpora lutea; the ovary apparently responds first by hyperemization and then by follicle ripening, to be followed in turn by corpus luteum formation. The question of whether the hyperemic factor is a new gonadotropic factor as suggested by Zondek, or is merely a manner of early expression of the LH or luteotropic principles, is yet to be answered.

The use of a two-hour pregnancy test in our hands certainly demonstrated a high degree of accuracy comparable with that of any one of the many tests advocated in the literature. We have noticed in the past that reference to the two-hour test had been made since the publication of our preliminary results.[14] At this point it is to be emphasized that at no time was our procedure followed implicitly. Despite the fact that the two-hour test was quoted, essentially the work was done according to the 6-8 hour procedure of Salmon et alii.[10] The urine, according to our method, is injected intraperitoneally, thereby attaining a higher degree of rapidity in the action of the urinary gonadotropin upon the ovary. Zondek et alii,[17] Farris,[18] and Salmon et alii,[10] have described two-hour subcutaneous procedures which certainly lacked the degree of accuracy that we have attained with our method. When we compared the subcutaneous with the intraperitoneal method of urine administration, we found, as has been reported, that the subcutaneous procedure was only 60-65 per cent accurate at the end of two hours, but 100 per cent accurate after six hours had elapsed. Farris claims that he observed a hyperemic reaction in the ovary of rats two hours after they had been injected subcutaneously with urine collected from men following coitus. We have been unable to confirm Farris' observation, using either the subcutaneous or intraperitoneal method. We have also administered urine obtained from normally menstruating patients at various days in the cycle and have never been able to observe a positive hyperemic reaction when the urine was injected intraperitoneally or subcutaneously. Farris' suggestion that anticipation of and coitus in a male or female and the ovulating period in the female in the midmenstrual cycle is a stimulus for the hypersecretion of gonadotropic hormone as determined by his two-hour procedure does not explain the rapid excretion of this material in concentrated form in the urine. Peculiarly enough, we have never been able to observe a positive hyperemic response in rats injected with urine during the first seven to ten days of pregnancy, a time when a notable increase in gonadotropic excretion is to be expected. Until confirmation of Farris' results are made we can explain the discrepancy between his observations and ours only upon the fact that he has not observed an adequate number of controls to establish satisfactorily the validity of his color standards. In

all probability if his color index would delineate sharply slight hyperemia from the intense hyperemia readily observed after the administration of pregnancy urine, more valid results would be attained. Perhaps traces of luteinizing hormone are present under the conditions he observed, as insanity, in men anticipating coitus and after coitus, but certainly they do not approach the titer observed in the urine of pregnant women. With little experience one can easily distinguish between questionable hyperemia and the marked gross changes apparent without the use of a color standard and thus obliterate erroneous positive readings.

The data obtained with the two-hour pregnancy test support the contention that this is the most rapid test for pregnancy yet to be described. Rapidity in action of pregnancy tests has been the ultimate aim of all the various tests for pregnancy suggested since the first epochal presentation by Aschheim and Zondek.[3] However, the A-Z procedure, fraught with disadvantages, was replaced by the Friedman test. This latter test, while considerably more rapid than the A-Z test, is complicated by several distinctly undesirable features; the animals have to be isolated 3-4 weeks prior to use; they are comparatively expensive animals and, due to their size, fairly adequate space must be available to maintain them in a satisfactory condition.

Other tests attaining speed have been described. The most popular one, especially on the continent, is the Hogben clawed toad test.[19] The toad test has been time-tried and found to be accurate. Nevertheless it must be said that the test is not without many encumbrances, such as the necessity of concentration of urine, difficulty in obtaining animals in this country, and the inconvenience entailed in their proper maintenance in the laboratory.

We believe that the goal of all pregnancy tests, speed and accuracy, has been adequately filled by the two-hour pregnancy test. Consistent with the requirements of speed and accuracy are the results obtained with the use of the two-hour test in the detection of ectopic pregnancy. A rapid diagnostic test for pregnancy attains its prime purpose by its utilization in the detection of ectopic pregnancy. Despite the four cardinal signs suggested by Heaney,[20] Allen,[21] and Torpin,[22] the clinician at times is reassured by having his diagnosis made or confirmed by a pregnancy test. Inasmuch as ectopic pregnancy is one of the few emergencies of obstetrics requiring a high diagnostic acumen and rapid operative intervention, the clinician is unwilling to depend upon the usual time consuming pregnancy tests for confirmation of his diagnosis. The two-hour procedure nullifies this disadvantage and has been employed in a total of 18 cases of ectopic pregnancy.* A correct diagnosis was obtained in 15 cases (*Table 5*). An analysis of the three false negatives showed that necrobiosis of the villi was observed in a pathological examination of the tubular contents of two of these patients, and only a sparse number of viable villi was observed in the third patient. Since the biological tests of pregnancy are dependent upon the increased gonadotropic secretion, it is evident that when little or no viable placental tissue is present, sufficient hormone excretion cannot be produced to give a positive test. The three false negatives then can be ascribed to the lack of a sufficient production of gonadotropic hormone by the trophoblast to affect the ovaries of test animals.

In conclusion the two-hour test for pregnancy offers the following advantages:

(1) The results attained are highly reliable and, excluding the findings observed in ectopic pregnancy, a 99.5 per cent accuracy was attained.

RESULTS OF THE TWO-HOUR TEST IN ECTOPIC PREGNANCY

Total number of cases	18
Correct diagnosis	15 (83.3 per cent)
Incorrect diagnosis	3 (16.6 per cent)
2 cases—Necrobiosis of Villi	
1 Case—Few Viable Villi	

Table 5

*The authors are indebted to Dr. Richard Torpin, Chief of the Department of Obstetrics and Gynecology, for making these cases available for study.

(2) There is no need to purify or concentrate the urine prior to injection. A morning specimen, although desirable, is not essential.

(3) There is no difficulty in administering the urine.

(4) The test animals are cheap, easily raised, readily available and a considerable flexibility in choice of animals with respect to age and weight is permitted.

(5) The time necessary for completion of the entire procedure is two hours and only 1-2 minutes are required for the performance of each test.

(6) The test is easily read and requires little experience.

(7) The test involves no discomfort to the patient.

SUMMARY

Employing the hyperemia inducing effect on the ovary of gonad-stimulating substances in the urine of pregnant women as the basis of the reaction, a two-hour pregnancy test is described utilizing the immature female rat as the test animal. The unconcentrated urine is administered by intraperitoneal injection. The percentage of accuracy of the test (excluding the observations in ectopic pregnancy) proved to be 99.5 per cent in a total of 752 tests performed on 1346 rats. Comparison of the two-hour test with the Friedman test in a series of 251 cases showed the rat test to be 100 per cent accurate in this series as compared to 97.3 per cent accuracy with the rabbit procedure. It was found that the hyperemic procedure was also adaptable to the immature hamster and adult female mouse providing 15 hours elapsed between the time of injection of urine and examination of the ovaries. Neither guinea pigs nor immature female mice could be satisfactorily adapted to the hyperemia end-point for the diagnosis of pregnancy. Observations on the hormone responsible for the ovarian hyperemia indicated that this reaction is dependent upon luteinizing or luteotropic activity of the administered urine. Employment of the two-hour test in cases of suspected ectopic pregnancy showed that in a total of 18 cases, a correct diagnosis was attained in 83.3 per cent. The advantages of the two-hour test are enumerated and its lack of encumbrances, as compared to other diagnostic tests for pregnancy, are evaluated.

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THE GENITO-URINARY SYMPTOMS OF ANORECTAL DISEASE*

By GEORGE H. THIELE, M.D.
Kansas City, Missouri

Physicians who limit their efforts to a special branch of medicine or surgery are prone to forget that after all, the best specialist is the one whose fund of general medical knowledge is the greatest; and that conversely, the best general practitioner is the one who has the broadest knowledge of the specialties. We should therefore evaluate the specialty of proctology not only on the basis of its accumulated special information, but also upon the basis of its dissemination of that information to the general practitioner. As proctologists we have then, a definite obligation to teach proctology to the general practitioner so that he too may profit by our experiences. It is with these thoughts in mind, that I have chosen to discuss some of the genito-urinary symptoms caused by anorectal disease.

As one reviews the proctologic literature of the past three-quarters of a century, one is impressed by the paucity of references to urologic and gynecologic diseases, particularly where the only subjective symptoms have been those referable to the anus, rectum, and sigmoid colon.

Textbooks on diseases of the anus, rectum, and sigmoid colon have been notable in their almost entire disregard of the relationship of anorectal symptoms and disease to urologic and gynecologic disease. It is of some interest to cite the comment or lack of comment concerning genito-urinary diseases by the authors of textbooks on proctology.

Van Buren,[1] 1882, did not mention the genito-urinary system. Kelsey,[2] 1884 reported a case of death from urinary retention in the bladder and back pressure on the kidneys, complications of a rectal abscess. Mathews,[3] 1892, in his only comment, said "It may be that the rectal condition is exciting pain and distress in the uterus and ovaries." Allingham,[4] 1901, did not refer to the genito-urinary diseases, and Tuttle,[5] 1906, completely ignored them.

The first real textbook reference to genito-urinary symptoms is found in Hirschman's "Handbook of Diseases of the Rectum"[6] published in 1909, in which he says that

"Pressure symptoms in the bladder, pain and burning at the vesicle neck and enuresis; all may be due to a number of anal and rectal diseased conditions. Fissure and ulcer are the most frequent causes of bladder irritability."

Gant,[7] 1909, refers to disorders of micturition, but does not comment. Albright,[8] 1909, says,

"The reflex symptoms are numerous and may involve the uterus and ovaries in women, in men the testicles and prostate, and in both sexes the bladder, causing irritability and frequent call to urination."

Earle,[9] and Wallis,[10] 1912, did not mention the genito-urinary system.

Bodkin,[11] 1913, says,

"Frequent and painful urination is often due to fissure *in ano*, particularly when located in the anterior median commissure. Fissure *in ano* is commonly overlooked in children as a cause of these symptoms. Rectal disease located low down usually causes reflex irritation of the bladder."

The title of chapter twenty-eight of Bodkin's book is "The Relation of Gynecology to Rectal Diseases," and in this respect his book is a distinct departure from all other textbooks. Rankin, Bargen, and Buie,[12] 1932, make no reference whatever to urologic or gynecologic symptoms as having been caused by anorectal disease, but do mention that

"Disease of the seminal vesicles, prostate gland, oviducts, uterus or other pelvic organs, may play a part in the production of pruritus ani."

Essentially the same statement appears in Buie's[13] monograph on "Pruritus Ani," with the added statement that diseases of these organs have been thought to be directly responsible for pruritus ani.

Bacon,[14] 1938, alludes to a paper by myself on the reflex symptoms of anorectal diseases, and refers also to the fact that

"in cryptitis, symptoms are referred to the urogenital area by reflexes through the internal pudic, the third and fourth sacral nerves."

Discussing fissure *in ano*, Bacon further says,

*Chairman's Address, Section on Proctology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

"Reflex phenomena may be encountered by virtue of the anatomic relationship between nerves of the anal area and the urogenital organs. For instance, symptoms may be referred by way of the pudic nerve to the uterus and ovaries as dysmenorrhea or amenorrhea; to the vagina as vaginismus; to the bladder as dysuria or urinary retention; to the seminal vesicles as involuntary emissions; or by way of the iliolumbar and sciatic nerves to the back, hip, and leg."

Exclusive of textbooks, careful search of the literature as far back as 1870, reveals only a single paper devoted to this subject. This paper was written by James H. Montague,[15] and was published in the *Urologic and Cutaneous Review* in 1930 under the title of "Urological Symptoms Observed in Rectal Diseases." There is, however, a voluminous literature concerning the genito-urinary symptoms concomitant with, or as a result of operation for carcinoma of the rectum, recto-sigmoid, and colon.

As a basis for the present discussion we should review briefly the close embryologic and neurologic relationship which exists between the anus, rectum, and recto-sigmoid, and the genito-urinary organs.

EMBRYOLOGY

So far as the embryologic relationship of the anorectum to the genito-urinary system is concerned, it is sufficient to recall the following facts: the anorectum and bladder have a common origin in the fetal cloaca, which about the seventh week of fetal life has become divided by the descent of the urogenital septum, into the bladder anteriorly and the rectum posteriorly. By the end of the eighth week the anal and urogenital membranes have been formed by fusion of the entoderm and ectoderm.

Opening into the urogenital sinus or anterior portion of the cloaca are the wolffian and muellerian ducts. The wolffian duct is the earliest structure from which the urogenital system develops. In the male, the epididymus, vas deferens, and ejaculatory ducts develop from the wolffian or mesonephric ducts, and in the female there is developed the duct of the epoophoron and the vesicular appendages of the ovary. The ureter and its pelvis in both sexes arise from the wolffian duct, and in the male the seminal vesicles are outgrowths from it. From the paramesonephric or muellerian ducts are developed the uterus, tubes, and vagina, and in the male the appendices of the testis, and the prostate.

This very close association between the development of the anorectum, and the bladder, urethra, and all of the reproductive organs is attended by the development of a common cerebrospinal and autonomic nervous system.

INNERVATION

The *cerebrospinal* innervation of the anorectum and genito-urinary organs is supplied by the pudic nerve, derived from the second, third, and fourth sacral nerves. The *sympathetic* innervation is derived from the pelvic plexuses and their subdivisions. The *parasympathetic* innervation is derived through the so-called *pelvic vagus* which has its origin in the first and second lumbar segments of the cord, and passes into the pelvis through the second, third, and fourth sacral nerves, supplying the anorectum and all of the genito-urinary system except the ureter. (*Fig. 1.*)

Stimulation of these organs, either directly or reflexly, if through the *sympathetic* fibers, produces the following effects: the smooth muscle of the bladder, rectum, and ureters relaxes, the relaxation being accompanied by contraction of the sphincters of the anus and bladder. *Parasympathetic* (*vagal*) stimulation, whether directly or reflexly, produces contraction of the smooth muscle of the bladder and rectum, with accompanying relaxation of their sphincters. There is no effect upon the ureter.

In view of the embryology and neurological anatomy of the rectum, anus, and genito-urinary system, there seems to be little reason for us to doubt that a lesion of the anorectum or sigmoid colon could produce any number of reflex disturbances of the bladder, ureter, seminal vesicles, prostate, uterus, tubes, and ovaries. Clinical observation verifies such a conclusion.

CLASSIFICATION OF SYMPTOMS

URINARY DISTURBANCES

The most common urinary symptoms resulting through a reflex from anorectal disease, are increased frequency and urgency. These symptoms may arise through two entirely different types of reflexes.

(1) *Parasympathetic Reflexes.*—The usual

reflex from an anal lesion is vagal in origin and produces contraction of the urinary bladder with a functional loss of tone of the bladder sphincter. Urinary frequency with passage of small amounts of urine results because of reduced bladder capacity and poor sphincteric tone and control.

CASE REPORTS

Case 1.—Mrs. R. M., age 64, consulted me December 5, 1932, complaining of a sense of pressure in the rectum, accompanied by frequent imperious passage of small amounts of urine. The symptoms had existed for three days. Examination revealed an acute proctitis. The rectal mucosa was very dark red and edematous, and there were large congested hemorrhoids. The urine was normal except for a trace of albumin. The proctitis was treated with instillations of warm neutral acriflavin solution, and after five days a hemorrhoidectomy was done. The urinary frequency became less marked as the proctitis improved, and at the end of three days urination was normal in all respects.

Case 2.—Mrs. J. R., age 44, was first seen May 26, 1945. She complained of pain in the right lower abdomen and in the bladder; both symptoms had existed for one year. The pain in the bladder was tenesmic in character and there was a nocturia of ten to fifteen times with passage of very small amounts of urine. Two negative cystoscopic examinations had been made. Anorectal examination revealed a posterior anal ulcer, hemorrhoids, and a chronic cryptopapillitis. After another negative cystoscopy, operation was performed on June 19. By June 30, the bladder capacity was increased although increased frequency was still present. Four weeks later the bladder capacity was almost normal and the increased frequency was disappearing. Two months from the date of operation, all bladder and urinary symptoms had disappeared, but the patient still had a spastic colon. (*Fig. 2.*)

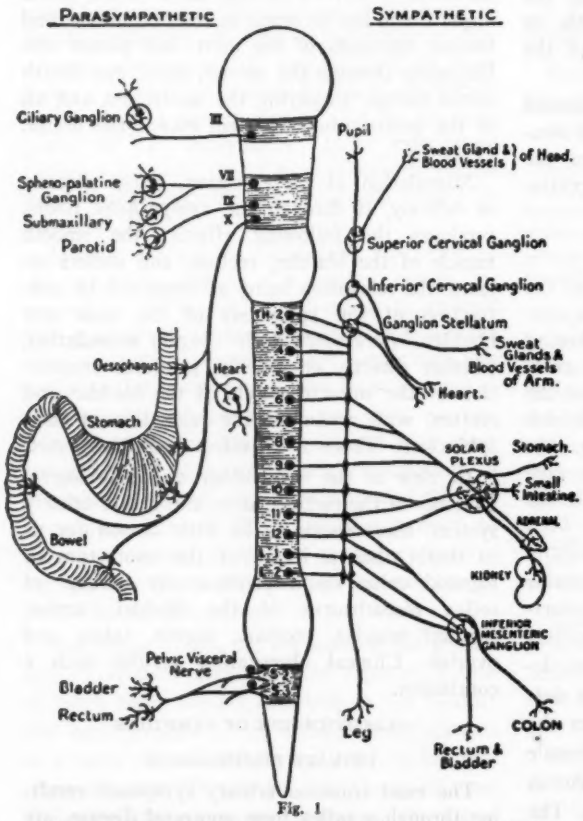

Fig. 1

Scheme of the general arrangement of the autonomic nervous system. Left side of figure shows the origin and distribution of the parasympathetic nervous system; right side shows the origin and distribution of the sympathetic nervous system. Reflexes from any organ supplied by either system may affect any other organ so supplied. (From "The Sympathetic Nervous System in Disease," W. Langdon Brown, London, Oxford University Press, 1920.)

(2) *Sympathetic Reflexes.*—Urinary frequency may also result from sympathetic reflexes which manifest themselves in dilatation of the bladder with concomitant spasm of the bladder sphincter. This is the typical atonic bladder most commonly seen postoperatively. Aside from the postoperative cases, I have seen a number of instances of this type of reflex; indeed, it may produce the only subjective symptoms of anorectal disease, and may exist with a perfectly normal urinary apparatus. If the urinary retention is allowed to continue long enough without catheterization, urinary frequency of the dribbling type results.

CASE REPORTS

Case 1.—Mr. F. R., age 54, was referred by a urologist on June 23, 1943. He had been unable to urinate for a period of one week, and had been referred to the urologist who catheterized him and obtained a huge amount of urine, and who in routine rectal examination had felt some roughening of the anterior rectal wall. The patient had had three injections for internal hemorrhoids, the last of which was one week before

I saw him. Immediately following the last injection he had been unable to urinate and had been catheterized daily for six days. Examination of the rectum revealed a large area of gangrene of the anterior rectal wall. The patient's temperature was 98.°, the pulse 140. He was cold and clammy, and in mild shock. He was immediately hospitalized, large doses of sulfathiazole were prescribed, and a Foley catheter placed in the bladder. The catheter was removed on the third day, and thereafter urination was normal. On the sixth day the patient passed a large slough from the anterior rectal wall. He was dismissed from the hospital on the eighth day, and three months later a hemorrhoidectomy was done. He has remained well to date.

Case 2.—Mrs. I. L., age 35, was referred on April 7, 1944, by a urologist whom she had been consulting for three months because of urinary frequency. She also complained of anal burning with defecation. Urological investigations had been negative. Anorectal examination revealed a posterior anal ulcer, hemorrhoids, and cryptitis. Surgical correction of the anal canal was done May 16, 1944. She was catheterized once after operation and 700 cubic centimeters of urine was obtained. From that time on, she urinated normally without pain or increased frequency. She has continued to remained well. (*Fig. 3.*)

Combined with either the sympathetic or parasympathetic type of reflex bladder frequency, there is usually a concomitant cerebrospinal reflex which manifests itself as pain.

Seaman and Bennig,[16] say: "When both sympathetic and parasympathetic reflexes are involved, an atonic bladder with relaxed sphincter and floor of the vesicle neck results."

MENSTRUAL DISTURBANCES

Amenorrhea may result from anorectal disease either as a purely sympathetic reflex or as a manifestation of vicarious bleeding from the rectum. The latter type of amenorrhea, I believe, occurs most frequently in those women who are approaching the menopause. The onset of a menstrual period at an irregular interval as a result of hemorrhoidectomy is not uncommon, and metrorrhagia and/or dysmenorrhea have frequently been observed to cease following the correction of an anorectal lesion.

CASE REPORTS

Case 1.—Miss J. R., age 18, was referred by her physician because of recurrent anal pain over a period of three years. She had not menstruated for seven months. Excision of an anal ulcer, infected crypts, and hypertrophic papillae was done. Regular menstrual cycle was established and continued for three years, when slight irregularity recurred and the patient was referred back to her physician. She had been married in the interval and domestic unhappiness was undoubtedly a factor in the recurrence of her menstrual irregularity.

Case 2.—Miss G. M., age 34, was seen in June 1934. She complained of cutting anal pain with defecation, chills and fever of undetermined origin, nervousness, crying, sacral backache, nausea and vomiting, and menstrual irregularity. All of these symptoms were of four years duration except that the nausea and vomiting, chills and fever had followed a daily enema for five months. This patient had spent two weeks in the hospital three months previously, to determine the cause of chills and fever, nausea and vomiting, without success. On July 6, 1934, resection of an anal ulcer, hemorrhoids, crypts and papillae was done. Chills and fever, nausea and vomiting followed the administration of two postoperative enemas. Convalescence was otherwise uneventful. The patient gained eight pounds in six weeks. All nervous symptoms receded, the menstrual periods

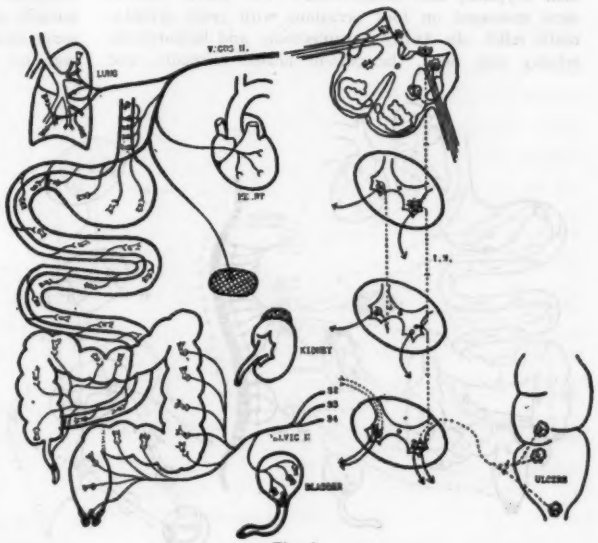

Fig. 2

Right side of the figure shows the impulse from a lesion of the lower rectum or anus passing to the cord, and its transmission to the nuclei of the vagus through intercalated neurons (I.N.). The left side shows the possible distribution of these reflexes through the vagus and pelvic nerves. Reflexes of this type are parasympathetic in origin and are responsible for contraction of the bladder with relaxation of its sphincter. See *Cases 1* and *2* under *Parasympathetic Reflexes.* (Adapted from W. L. Brown and F. M. Pottenger.)

became regular and normal, and there was a gain of forty pounds during the first postoperative year. The chills and fever, nausea and vomiting were thought to have been due to the absorption of bacterial proteins through the raw anal area, producing a reaction similar to that produced by the intravenous administration of a vaccine. Nine years later this patient was still in good health except that menstrual irregularity and nervousness had existed for six months. This was thought by her physician to be due to the approaching menopause, and was treated by the internist with female sex hormones.

VAGINISMUS WITH DYSPAREUNIA

Vaginismus and consequent dyspareunia may be the chief symptoms of an anorectal lesion, or the result of anorectal surgery. These symptoms are due to spasm of the levatores ani as the result of sympathetic and/or cerebrospinal reflexes.

CASE REPORT

Mrs. R. H., age 33, was seen January 14, 1944. Her chief complaint at that time was of constipation with a sense of severe pressure in the rectum, of seven months duration. Examination revealed bilateral spasm of the levator ani, piriformis and coccygeus muscles, chronic anal cryptitis, and hemorrhoids. The pelvic muscles were massaged on four occasions with great symptomatic relief. In April, a cryptectomy and hemorrhoidectomy was done, the patient healed normally, and returned to her home where she continued to improve only slowly. In June she returned, complaining of pain in the right side of the vagina, and of dyspareunia. There was also pain down the back of the right thigh. Examination revealed marked tenderness and spasm of the right levator ani and piriformis muscles. The right levator ani was so tight that surgical division of the edge of the muscle through the vaginal wall was considered. However, the patient was taught how to massage the right levator per vaginam, and returned home. She began to improve immediately, and during the next five months she completely recovered. On December 14, she wrote "The pain is gone and I have no functional trouble at all now. I am certainly happy to be so well again."

GENITAL SYMPTOMS IN THE MALE

In the male, perineal pain referred by the patient to his genital system, is not infrequently due to a silent lesion of the anorectum, the symptom having resulted from reflex contraction of the levatores ani.

CASE REPORTS

Case 1.—Mr. W. O., age 44, was referred November 21, 1944, by a urologist. His chief complaint was sharp shooting perineal pain, recurrent since 1937. He had consulted a number of urologists, and had had intermittent prostatic massage since 1937. There had been some bleeding from the anus following prostatic massage on several occasions, but there were no other anorectal symptoms. Examination revealed internal hemorrhoids with chronic anal cryptitis, and marked bilateral levator ani spasm. After seven levator massages his symptoms were completely relieved, but on cessation of massage his pain recurred to a mild degree. Hemorrhoidectomy and cryptectomy was done December 29, 1944. On February 16, 1945, he said that he had remained completely free of his former symptoms and was completely well.

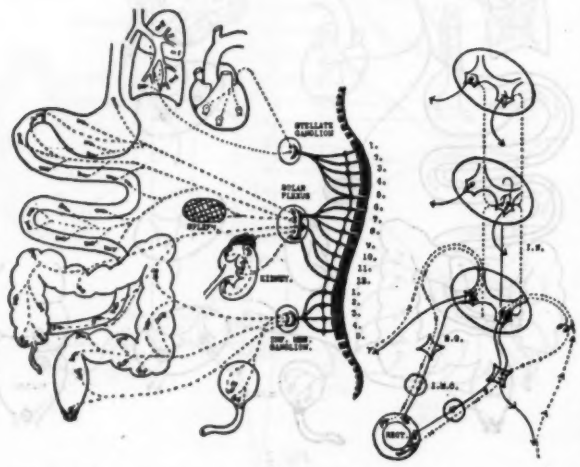

Fig. 3

Right side of the figure shows the impulse from the anorectum to the cord (dotted lines); its transmission up the cord through the intercalated neurons (I.N.). Left side shows the possible distribution of these reflexes. They produce relaxation of the bladder wall and contraction of the bladder sphincter. These reflexes are sympathetic in type. See *Cases 1* and *2* under *Sympathetic Reflexes*. (Adapted from W. L. Brown and F. M. Pottenger.)

Pain in the testicle may be found to be the result of an anal lesion, after careful urological examination has failed to reveal the cause.

Case 2.—Mr. A. C., age 49, was seen on February 14, 1940. He complained of throbbing pain in the anus, and pain in the testicles of eight months duration. He had had injections for internal hemorrhoids two years previously with good results. Eight months before he consulted me, he had had "ambulatory surgery" because of anal pain. Immediately following this procedure, pain in the testicles began, and had continued to date. Examination revealed a posterior anal ulcer with a subcutaneous

fistula, cryptitis, and internal hemorrhoids. The patient was hospitalized and operated upon. Anesthetic oil was injected perianally and an abscess formed as a postoperative complication. The pain in the testicle was relieved at once by the operation, however, and although granulation tissue formation was very slow, he was completely healed by July 1940. He remained free of testicular pain until in June 1943 he passed a hard dry stool and produced an anal fissure. Pain in the testicle recurred at once, but disappeared with healing of the fissure. The patient has been free of testicular pain since that time.

In the male, reflex ejaculation with sudden and embarrassing seminal emission may be the chief complaint even though the lesion is entirely of anorectal origin. If the lesion is above the mucocutaneous junction, the patient may not be aware of it.

Case 3.—Mr. G. C., age 58, was seen in August 1945 because of imperious and incontinent seminal discharge, intermittent during the preceding four weeks. One month before he consulted me he had had an internal hemorrhoid injected with apparently satisfactory results. Soon thereafter he noted the onset of seminal discharge, particularly when on a street car or when under nervous stress at his office. One week later he submitted to another hemorrhoidal injection, and ever since that time seminal discharge had been a frequent and embarrassing occurrence. Examination revealed a discrete ulcer one centimeter in diameter at the site of injection of anterior internal hemorrhoid. The ulcer was treated with a weak solution of silver nitrate and within two weeks was healed. Since its healing no further seminal discharges have occurred. Hemorrhoidectomy was done October 11, and on November 3 he was completely well.

ANORECTAL SYMPTOMS OF GENITO-URINARY DISEASE

While this discussion has dealt with the genito-urinary symptoms of anorectal disease, we may for the sake of completeness and contrast, briefly list a few of the anorectal symptoms of genito-urinary disease.

Gonorrheal in both sexes may be discovered only after the patient has consulted the proctologist because of anorectal pain due to gonorrheal proctitis or cryptitis.

Anal or peri-anal chancre or chanroid may be the initial lesion of syphilis or chancroidal disease. Relaxation of the anal sphincters with incontinence for flatus and loose stools may be the first subjective symptom of tabes dorsalis.

There are numerous other genito-urinary diseases in which a symptom referable to the terminal bowel may be the initial one. Thus, pain in the upper rectum, or painful defecation may be the chief complaint in a woman with an abscess in the pouch of Douglas. Pain when sitting, or other of the attendant symptoms of pelvirectal abscess may be the chief complaint of a woman with pelvic inflammatory disease. Obstipation has been observed to be the initial symptom of a low-lying fibroid or of an ovarian tumor.

CONCLUSION

I am well aware that I have presented nothing new to the proctologists attending this meeting. My purpose has been to provoke a discussion which might be of interest and possibly of some value to the general practitioners who are with us, and to excite their interest in the specialty of proctology.

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1600 Professional Building

DISCUSSION (*Abstract*)

Dr. Louis J. Hirschman, Detroit, Mich.—Of course, diseased anal crypts are such important foci of infection that reflex conditions as well as symptoms of infection in other parts of the body can be traced to

this source. This includes not only the genito-urinary system but the uterus and adnexa as well.

Occasionally over-enthusiastic prostatic massage will cause trauma to the anal canal, and, occasionally, a papilla may be torn by this treatment. A crypt can be damaged and subsequent infection of this may cause reflex prostatic irritation. The patient often erroneously blames the prostatic massage for this supposed recurrence of his prostate symptoms.

A point in connection with the gynecological aspect of rectal pain is that occasionally a retroverted uterus, particularly if fixed in the pelvis, may press on the rectum and cause considerable pain during defecation. On the other hand, anteversion can also cause pressure on the rectum against the hollow of the sacrum causing considerable discomfort during defecation. Occasionally, an inexperienced examiner may note the pressure of an "umbilicated tumor" of the anterior wall of the rectum and report this unusual finding as being the cause of the patient's dyschezia. This so-called tumor is really the cervix being pressed against the rectum which in turn is being pressed against the hollow of the sacrum.

PEDIATRIC TRENDS*

By JOSEPH A. BAUER, M.D.
St. Louis, Missouri

Child care has come a long way since the middle of the nineteenth century. At that time such instructions as were given in pediatrics were part of the course of obstetrics and gynecology. Jacobi might be considered the father of modern pediatrics, having been appointed to the special chair of Diseases of Children at New York Medical College in 1860. In these early days the study and care of children consisted largely of observations of signs and symptoms and the administration of numerous empirical drugs. Folk medicine, with its belief that evil spirits, demons and gods inflicted disease and malformation on human beings and its treatment of these malign influences with charms, amulets and incantations, confronted the physician at every turn. Little was known of preventive medicine although reference may be found in the writings of the Babylonians as to the harmful effects of insects, worms and parasites and they recommended swatting the fly.[1,2]

*Chairman's Address, Section on Pediatrics, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*From the Department of Pediatrics, Washington University School of Medicine.

A good part of the growth and improvement in our branch of medicine has been closely integrated with the general advances in medicine, sanitation and hygiene. That this improvement is closely geared to our economy, is shown by various studies of the Children's Bureau which clearly indicate the greatest incidence of infant deaths are among the lowest wage groups. The tremendous advance made in handling of diseases of children may be visualized by a glance at tables of vital statistics.[3] To show improvement as the result of immunizations and treatment let us look at three diseases which are largely limited to children and claim many lives. Consider the statistics per 100,000 population of 1900 versus 1942: the death-rate from diphtheria dropped from 40.3 to 1, pertussis from 12.2 to 1.9, scarlet fever from 9.6 to 0.3 deaths per 100,000. Wider use of proven immunization procedures will further improve the picture. Smallpox vaccination which is almost universal and was widely practiced in 1900 shows the following: 3.7 versus 0 deaths.

The decline in mortality rates for infectious and preventable diseases can be attributed largely to development in public health and medical practice. Since the turn of the century great progress has been made in environmental sanitation particularly with respect to water and milk supply, disposal of domestic and industrial wastes, immunization and improvement in diagnostic aids and in surgical and medical treatment of disease. Improved sanitation and nutrition has given us a drop in the deaths from diarrhea and enteritus from 142.7 to 8.8 per 100,000 population. Although its application is not limited to pediatrics many of the deaths from motor vehicle accidents occurred in children: In 1941 the rate was 30 which dropped to 21.2 in 1942 with the imposition of tire, gas rationing and speed restrictions.

Research has made available many important vaccines and drugs for treatment of diseases peculiar to childhood. Those that come to my mind are antitoxins, toxoids, arsenicals, quinine and atabrine. Perhaps the most important contribution to public health in recent years is the use of sulfonamides for treatment of bacterial infections and most recently the addition of penicillin. This might be aptly illustrated by the death-rate on pneumonia and influenza

which in 1937 was 114.9 per 100,000 population and with the general use of sulfonamides dropped to 55.7 in 1942. These drugs have made it possible for the physician, once an accurate diagnosis has been made, to attack directly and effectively the enemy that confronts his patient. Further, we have learned to calculate the dosage of these drugs based on body weight and not on chronological age with its obvious inaccuracies. However, our increasing knowledge has brought to light a group of illnesses caused by the filtrable viruses. Here, because of the technical difficulties involved in their study, much remains to be done.[4] The war has taught us value of coordinated research. Dr. Weech will elaborate on this in his paper.

Today the busy practitioner is frequently awed and bewildered by a deluge of material concerning the formidable array of preparations offered for his use by ethical drug houses. Many of these beautifully packaged products are the same drugs or combinations under various trade names. Standardization of these products and elimination of many would simplify and improve their use for the busy doctor.

That the science of nutrition has made vast strides is amply confirmed by the size and health of our young adolescents. In early pediatrics great stress was placed upon the precise preparation of infants' and children's feeding. Long mathematical equations and formulas were used to compute the exact amount of protein, fat and carbohydrates thought to be desirable. Later, as our knowledge increased, vitamins and minerals were added. We have learned that lower animals control the amount they eat and have some inner sense of qualitative selection of foods. This has been convincingly demonstrated to be present in human beings from infancy. By providing the growing child with adequate amounts of the necessary food factors and preventing the perversion of his appetite by curbs, food fads and unpleasant situations at meal time, optimum nutrition should result.

An interesting trend has been the swing away from breast feeding. Observation on 150 babies at six weeks of age in private practice showed 50 babies breast fed, 88 at the bottle and 12 breast and bottle. A like number of clinic patients showed 101 breast fed, 35 at the bottle and 14 breast and bottle. This has undoubtedly been accomplished by the separation of the infant from the mother except at four to six rigidly timed intervals during a twenty-four hour period when the mother is permitted to behold her offspring for a period of twenty minutes. Those unfortunate babies who become hungry between these periods give vent to their feelings by crying and kicking which, if continued for an hour or more, exhausts the baby. His next nursing period is spent largely in sleeping. Under these conditions the mother's breast receives little or no stimulation, and an unsatisfactory association is created. In the last few years we have begun to realize that a schedule based on the wisdom and demands of the baby contribute to the happiness and contentment of both mother and child.

We come now to what I consider one of the most important trends in the practice of pediatrics and one which will surely increase as we learn more of the whole child. The interdependence of physical, mental and emotional growth of the child has become so clear that we realize we cannot treat one without influencing the others. The practitioner finds himself in the enviable position of guiding the mother and father in the wise handling of the child during the formative stage. Certainly nothing we do to the child in later life will ever influence him as much as the attitudes we show in dealing with his first needs, such as food, comfort, love and security. The manner in which we guide him in the acquisition of successful patterns of feeding, sleeping, playing and working will prepare him for the world in which we live.[5,6] Of the many problems which arise in dealing with young children and their parents perhaps the most frequent is the complaint that "Johnnie won't eat." If, as the doctor, we explain in our early association with the mother the variation in the amount of food the baby will want and need and, as the child grows older, we show her how the growth processes decelerate with aging and caloric needs decline, much of the improper handling of the child and anxiety of the parents will be avoided,

not to mention the grandparents. As practitioners we must practice, as well as preach, honesty and consistency in our dealings with the child and respect him as an individual.[7 8 9]

In the popular conception sex education begins at puberty but we know that frequently children of four begin to inquire as to why boys and girls are different and where babies come from. Parents must be taught to answer these questions honestly and naturally and to explain not more than the child is capable of understanding. This may be illustrated by an incident which happened when my son was about five. Seeing his dog and another in the sex act, he dashed to his mother in a state of great excitement and asked her what they were doing. His mother explained that this was how the male dog planted the seed in the female dog so that she could have puppies. Considering this for a moment he asked, "How did you learn that Mother?" She answered "Oh, when I studied biology." After a long silence the boy queried, "Will I ever do that Mother?" "Do what, Son?" his mother replied, slightly nonplussed and sparring for time. "Study biology" was the reply.

Pediatric practice today demands not only weighing, measuring and physical examination of the child, but a recognition of his mental development, his emotional growth, his heritage and environment. Therefore, it is desirable that all of us interested in children must not only make use of good nutrition, sanitation, immunizations, accurate diagnosis and treatment, but should enrich our medical resources with some psychiatric understanding and technics.

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INDUSTRIAL MEDICINE IN THE NEW ERA*

By C. W. ROBERTS, M.D.
Atlanta, Georgia

Outstanding among the problems that challenge our attention at the present time is the question of the physician's relation to industrial practice. Your speaker feels that in the main services being rendered in industrial medical set-ups and in compensation practice are deserving of the profession's commendation. Moreover, as knowledge of the achievements of such employment increases, I find it easy to assume a more sympathetic attitude toward physicians so employed. Such criticism as has been visited upon them should, I think, be tempered by realization of the fact that organized medicine has been slow in creating plans suited to the economic status of the industrial groups now served under the corporate system. In other words, it would appear that such abuses as exist in present plans have grown out of the profession's delinquency in helping to develop set-ups through which these groups could be served, and that we cannot with good grace criticize the agencies that have been created largely under lay leadership or longer look askance at members of the profession who have lent their cooperation unless organized medicine after a realistic approach becomes convinced that the menace to the structure of medicine inherent in such departures is greater than is to be compensated by the gains to society achieved through them. The pressing need is for new standards bearing upon the relation of medical practice to industry, standards based upon factual data.

Approached from this viewpoint it becomes quickly apparent that the policies of medicine heretofore applied to the physician-industry relationship have partaken more of idealism than of realism, more of fancy than of fact. A complete medical service for the nation's employees can be developed only through the cooperation of the three groups immediately concerned, employers, workers and physicians. Such a serv-

*Chairman's Address, Section on Industrial Medicine and Surgery, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

ice will be quasi-social in nature, obligating all groups concerned to make contributions, even though precedents have to be broken. When so conceived, this new policy toward industry's medical problems will remove contract and corporate practice from the controversial field. Such past abuses as have existed in industrial practice are to be charged to a lethargic attitude of the profession in the formative period when the voice of medicine should have been heard.

INDUSTRY'S PRESENT CHALLENGE

In normal times there are some fifteen million people in this country engaged in the manufacturing and mechanical industries. This means that with their dependents the health of some one-third of the population is intimately connected with the conditions of employment. There are more than nine hundred occupational exposures to toxic materials and conditions, many of which affect the health of the worker adversely. A goodly percentage of the industrial population is exposed in varying degrees to harmful conditions existing in the working environment. Disabling illness is known to be higher among unskilled labor than in a comparable non-industrial group. Likewise, the death rate among industrial groups is higher than in comparable non-industrial groups. These facts are cited to bring vividly before you the unassailable conclusion that, regardless of the cause, there is preventable sickness and misery among our industrial population that will promptly yield to realistic attack. Certainly it is not difficult to conclude that the hand of our healing art has rested too lightly upon the suffering heads that need it most. The environment in which a man spends most of his life, whether it be the home, or the factory in which he works, influences to an immense degree his physical welfare. While it is not true that all the ailments of industrial workers have their origin directly in his place of employment, it is an indisputable fact that much exists within the walls of industry to contribute to the physical misfortunes of the worker, and within those walls there lies a field of activity in preventive medicine which challenges the interest of all of our profession.

There is an economic factor involved in the problems of industrial health which likewise deserves our attention. The National Safety Council says that the cost of claims, medical service, hospitalization and funerals for occupational accidents amounts to about five hundred and ninety million dollars per year. Add to this the cost of the economic loss due to slowing up of production, spoilage of materials and injury to machinery, and you will have a total estimated by one authority at five billion dollars a year, twelve times the value of all property destroyed each year by fire and twice as much as we spend on our entire public school system. When it is remembered that much of this burden can be lifted through the coordinated efforts of the medical profession, the workers and industry, our interest in the problem becomes obvious. But this stupendous economic burden but poorly portrays the tragic picture. It is the human cost which challenges us; the money cost may be borne, but the cost in maimed limbs and permanently stunted bodies violates the conscience of humanity and will not be tolerated.

THE COUNCIL ON INDUSTRIAL HEALTH

With the thought in mind of lending the full cooperation of the American Medical Association to Industry in the solution of its problems, there has recently been organized under authority of the House of Delegates a Council on Industrial Health. This Council developed a program which recognizes the fact that new problems are developing in industry and in the relationship of medical practice to such problems. The Council is striving to correlate the activities of other agencies organized for a similar purpose, to educate medical students and the medical profession in matters of industrial health, hygiene and safety, and is cooperating with industrialists and labor organizations in developing methods for sound health conservation.

The Council feels that the period which tolerated in the industrial physician a lesser measure of integrity, or excused in him derelictions in either education or physical appointments for his task, has passed into the limbo of an unsung era. We have arrived at a point in the evolution of industrial medicine where the poorly prepared physician is no longer equal to the tasks which are devolving upon him nor able to

command the respect of enlightened industrial employers.

In a well organized program two principles will be recognized as fundamental:

(1) That the welfare of the worker is of supreme concern.

(2) That the physician in industry is to be actuated and governed by the same ethical standards as obtain in private practice.

In the development of a program in which the position of the worker will be of foremost concern and that of the doctor the responsible agent for the initiation and direction of the proven technic applicable to the environment of the work-shop, it should be recognized that the interest of the worker is inseparably interwoven with that of the employer. Enlightened industry voluntarily assumes its obligation with regard to the protection of the health and the mitigation of accidents arising in connection with work hazards. Industry looks to the physician both in and out of the factory for fair play. The measure of service which industry will render through any proposed scheme will be determined by the medical intelligence exercised by those upon whom industry must rely for the application of industrial medical practices to the problems of industry. They should be protected from the burdens frequently imposed upon them through decisions and conclusions arrived at by speculative medical and judicial thinking. In personal injury cases, unless the tendency to resolve all questions of doubt as to liability into verdicts or awards against employers is curbed, the legitimate claims of those who have experienced loss from the hazards of work will suffer through the unjust burden imposed upon the back of industry. In other words, in order to keep the interest of the worker supreme in the industrial medical picture, the employer must be protected from exploitation growing out of avarice or ignorance.

To this end physicians must be trained in medico-legal industrial work: trained to apply that which is known and to refrain from the inequitable expediency of using speculative conclusions as proven facts.

INDUSTRIAL MEDICINE'S TASK

The interest of the industrialist in the physical welfare of his employees has had a natural and logical evolution. The stimulus came with the passage of compensation laws early in the present century. Liability for the medical care of the injured, for lost time and for the physical handicaps which followed in sequence led unerringly to programs of prevention. Liberal interpretations of these laws forced an interest in the question of latent disease among applicants for employment and the present preemployment examination. Good health was soon recognized not only as a prerequisite to employment but as an efficiency factor in production. Thus the employer became concerned with the health of the employee, both in and out of the working environment, an interest which has logically led into the present concern felt for the physical welfare for the workers' dependents.

Now that leading businessmen are making an effort to promote the welfare of wage earners through the adoption of progressive, humane programs, is it too much to hope that our profession will promptly accept its responsibility? I think not. Moreover, businessmen are accustomed to solve their problems by direct approach, casting aside with ready impatience dissentors who predicate their action upon policies which glorify the letter but crucify the spirit. They have small patience with us when we falter and offer as an excuse a traditional pattern of ethics so inflexible that our members, fearing heresy, hestiate to assume leadership. But let me hasten to say that I am not here counseling the scrapping of our code of ethics. On the contrary, I am suggesting that they be vitalized through emphasis upon their humane connotation. Principles are essential if we are to preserve a high quality of medical service, but they must be made to serve men rather than stand athwart the path of progress. Written originally as a guide to conduct in the relation of physicians to each other and to their patients and the public, their appropriateness in our day cannot be questioned. Life's ethical values do not change. But conditions under which doctors practice have changed. No longer is it possible for the physician to deal exclusively with patients as individuals. The welfare of the patient is served best when his neighbor and his neighbor's children are considered. The rights and prerogatives of the individual are now

abridged by the no less real rights of the group. The liberties of the individual stop, however precious or equitable, at the point where they come into conflict with the rights of others.

For years we have agitated the right of the patient in industry to choose his physician. There are none who would question this right when the parties at interest are restricted to the individual patient and the doctor. But the enactment of compensation laws, liability insurance, industrial set-ups, railroad medical services and a host of other medical innovations introduced a third party into the picture: another party who, under the sanction of law or custom, has a valid right in the type of medical service which those concerned in the plan receive. Consequently, at the 1937 meeting of the House of Delegates of the American Medical Association the Judicial Council recommended a revision of the code of ethics on the point in question, and the House of Delegates approved. This revision reads as follows:

"The phrase 'free choice of physician' as applied to contract practice is defined to mean that degree of freedom in choosing a physician which can be exercised under usual conditions of employment between patient and physician when no third party has a valid interest or intervenes. The intervention of a third party who has a valid interest or who intervenes does not *per se* cause a contract to be unethical. A valid interest is one where by law or necessity a third party is legally responsible either for cost of care or for indemnity. Intervention is the voluntary assumption of partial or full responsibility for medical care. Intervention shall not proscribe endeavor by component or constituent medical societies to maintain a high quality of service rendered by members serving under approved sickness service agreements between such societies and governmental boards or bureaus and approved by the respective societies."

There are perhaps other conflicts growing out of the necessity to deal realistically with industrial medical problems that will require still further revisions. The point is that the welfare of the people employed in industry must be protected and when this interest justifies modification in the principles heretofore held, we must not hesitate to act, insisting only upon retention of those safeguards necessary to a high quality of medical care.

CONCERNING THE AMERICAN WAY

Much is being said by way of interpretation of the term "American way of life." Its connotation may be expanded or contracted depending somewhat upon the student's social concepts. Many read into it the obligation to provide for all economic equality. To such a notion there are many dissenters with whom, without equivocation, I desire to enroll. So long as people exhibit varying talents and capabilities no common denominator of rewards for the exercise of these qualities will logically evolve. The very crux of the American way is that opportunity is afforded for the fullest development of such skills as one may acquire together with the rewards which his efforts justify. From Main Street to President, from cobbler to factory engineer or owner, this is the essence of the American way. To be given an equal opportunity to strive, this is an obligation inherent in the freedom which has made America great. To have a chance to work and to acquire through one's own effort the means to purchase the things and services which augment the enjoyment of life: this is the American way. Equality in things that may be seen, measured, and touched, no. Equality of opportunity to strive for these values and for those richer attributes of the mind and spirit: this is the American way.

If this be the task of America in the new industrial era: to hold unabridged our sacred birthright of individual initiative and to remove those obstacles and injustices that hinder its fullest expression, a primary duty calls for a candid acknowledgment of conditions as they are, and for such remedial technics as are needed rather than the assumption of an attitude of wishful reliance upon the hope that by some gracious dispensation of providence the multiplying injustices of the industrial age will spontaneously dissolve.

The concentration of manpower in industry during the war with the opportunity to study the effects of poor health upon efficiency has served to re-emphasize the value of industrial health programs and to increase demand for the extension of such services so as to cover the general population. Demand has been but partly satisfied due largely to the lack of trained personnel, but such help as has been made available has served measurably to push forward advances in this field and to merit the ap-

preciative approval of employers and workers enough to guarantee their continuation in peace. Moreover, industrial medicine and surgery as a specialty has come of age. Whereas there has been in the past a tendency to look upon this branch of medicine as something apart and upon those who practiced in this field as cast-offs from the general body of medicine, we now see the pioneers reaping a reward justly earned and a profession forced somewhat reluctantly to admit that in this field exists a challenge worthy of the best talent amongst us. But advances seem never to come except in the company of ideologies which threaten the very philosophy which gave them birth. If plans for the provision of medical care for workers and their families have proven to be economically sound, why, the impractical reformers say, should not Government step in and provide a national compulsory scheme for all the people. The stalwarts in the labor movement, entitled to the thanks of the nation for sound leadership in raising the economic level of industrial workers and thus enabling them to acquire for themselves the goods and services necessary to modern living, loom as the most vocal champions of a system of compulsory health assurance. Adamant in their insistence upon retention of labor's fundamental rights and ever active to hold those social gains which the worker has achieved, consistent in demanding that these measures be broadened so as to permit even wider enjoyment, we are startled to observe their readiness to destroy the whole structure of medicine by denying in this field the retention of those very fundamentals which they fight to preserve in their own. If the sturdy tree of medicine needs pruning, and our profession agrees that it does, why is there so much clamor for applying the axe to its trunk when only a few technics need to be developed in order to place its fruit within reach of all who desire it and are willing to go half way in obtaining it? Medicine's fundamental structure must be preserved, for without such safeguards as the physician-patient relationship unhampered by third party over-lords, the progress which has made medical service worthy of its classification as one of the nation's essentials along with food, clothing and shelter will be first halted and then reversed. This lamentable prospect is not what labor leaders and otherwise well intentioned reformers really want. They profess to believe that medicine's values will survive after dilution with fatal un-American doctrines. They envision quality standing untarnished in a system where quantity is produced under Governmental control. Such a viewpoint I submit, controvenes logic, runs contrary to experience and common sense, and makes a travesty of the American Way.

But let us return to the business of pruning the tree and to medicine's recognition of the fact that there is need of rapid adaptation of our present system to changing social concepts. It is in the field of method that controversy arises. That there are injustices and stumbling blocks to be uprooted, we do not now, nor have we ever denied. Many remedies have been evolved; others are receiving earnest consideration. Elimination of such stumbling blocks as stand in the way must be by trial and error and not by revolution. And what is the duty of industrial medicine in this unfolding scene?

As we contemplate our task amongst the complexities of the new age, we must insist, not upon blind adherence to past virtues, but on the creation of new technics to serve the requirements of medicine as they evolve out of the demands of industry in the new era. Moreover, medicine's basic virtues must not be assumed to be the vested rights of one branch of medicine to the exclusion of another. These virtues are unequivocal and dignify the labors of all who elect to adopt them as a code of conduct. Surely they are not to be considered as outmoded in our dealings with the medical problems of industry. On the contrary, there must be more and more insistence upon them as constituting the acceptable hallmark of those who qualify for industrial practice.

Finally, the task of industrial medicine in this day of changing social concepts is to hold a safe and common sense course between the inefficiency of extreme individualism on the one side and the tyranny of state medicine on the other. Thus I believe, with all the earnestness born of much sober thinking, that through the solution of the pressing problems of medicine in industry we may find for the perplexities of all medicine a muchly needed enlightening, and more that, by a strange paradox,

the profession's contrary stepchild, industrial medicine, may yet prove to be the modern Moses who will lead us out of the wilderness of threatened bondage into the liberties of a new day.

THE ETIOLOGY AND TREATMENT OF PEPTIC ULCER*

A REVIEW OF THE LITERATURE

By ERNEST H. PLANCK, M.D.
Anniston, Alabama

The interest in peptic ulcer as a lesion is widespread among the many fields of medicine, and is of particular interest to the internist, the radiologist and the surgeon who are more frequently confronted with the diagnosis and treatment of this condition. Due to the rapid increase in the number of cases of peptic ulcer diagnosed during war time, it is obvious that the attention of the medical profession as a whole should be more clearly focused on this problem at the present. Illustrative of the effect of national stress and strain upon the incidence of peptic ulcer are the following figures:

(1) In the annual report of the Surgeon General of the Navy thirty-five years ago, only two cases of peptic ulcer were listed for the entire year.

(2) In the annual report of 1940, even before we were in actual combat, one hundred and fifty-five peptic ulcers per 100,000 admissions were listed in the annual report of the Surgeon General of the Navy.

Palmer, in a review of the admissions to British military hospitals in 1942, found that digestive diseases accounted for about 15 per cent of all admissions, and of these cases 40-50 per cent were due to peptic ulcer. It is interesting to note that the British figures show 85 per cent duodenal and 15 per cent gastric ulcers, whereas American and Canadian figures combined show 96 per cent duodenal and 4 per cent gastric ulcers.

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During the past few years more stress than ever before has been placed on the psychosomatic background of peptic ulcer. The present world war has greatly increased the tendency to regard ulcer as the localized manifestation of a generalized constitutional derangement primarily of psychogenic origin. In a survey of thirty-three young adult males with ulcer, Winkelstein and Rothschild found that they all had characteristic psychic backgrounds of chronic frustration and repression of strong emotional stimuli. This statement fits in well with the opinion of Yaskin who has said that "the peptic ulcer case has an individual makeup characterized by rigidity, over-conscientiousness, and even intolerance." He found his cases to be over honest, meticulous, usually dynamic and even aggressive individuals. In line with this same type of investigation, Wolf's case histories showed: "Prolonged emotional turmoil involving mainly conflict, anxiety, guilt, hostility and resentment."

Alvarez of the Mayo Clinic has perhaps best expressed the present day belief of the medical profession as a whole in his statement that arterial spasm may be one of the links between the emotions and ulcer formation, and concluded that most ulcers are due mostly to emotional factors and nervous tension. He referred to the peptic ulcer patient as a keen, nervous, active, hard-living individual.

Although the psychogenic factor in the etiology of peptic ulcer is generally and widely accepted by the profession today, we have not yet been able definitely to establish the method through which these psychogenic factors actually produce chronic ulcer formation. For this reason, I believe that it is wise at this time to review some of the various theories of etiology and the experimental work that has been done in regard to each theory, principally as a means of stimulating further thought among the minds of the profession upon this very important subject.

Before going into a detailed discussion of any experimental work, it is necessary to enumerate the more commonly accepted theories of the etiology of peptic ulcer. Then, I shall attempt to elaborate and explain some of the experimental work that has been done in connection with each theory. McCann has listed the theories

and grouped the experimentally produced peptic ulcers on that basis as follows:

(1) Those resulting from a deficient blood supply to the gastric mucosa.

(2) Ulcers produced by the action of bacteria.

(3) Ulcers resulting from the action of toxic agents.

(4) Those resulting from trophic and glandular disturbances.

(5) Those produced by the action of the digestive juices.

(6) Ulcers produced by trauma to the mucosa.

Virchow, in 1853, was the first to offer the theory that vascular infarction was the primary etiologic factor in causing the formation of ulcer in the stomach. This theory initiated experimental work by numerous men who approached the problem from many different angles.

One of the earliest modes of attack was the production of multiple emboli by injecting an emulsion of wax into the femoral vein of rabbits. This method was not found to be successful, inasmuch as, although acute gastric ulcers were produced, the animals all died from embolism within about 24-36 hours, long before it was possible to demonstrate chronicity of the ulcers thus formed.

Next, the production of ulcers by causing anemia of the gastric mucosa was attempted through the ligation of various portions of the blood supply to the stomach. Litthauer has done a large amount of work on this problem. He found that the anastomoses around the stomach were so free that one-third of the blood supply could be cut off before an ulcer would be produced. Although Litthauer's efforts as a whole were unsuccessful, they did reveal, however, that the blood supply to the pylorus is sparse in comparison with that to the rest of the stomach. This work was done by injecting the vessels supplying the stomach with a red dye preparation, in a series of 21 cadavers.

Quite a few men interpreted Virchow's theory as a functional occlusion of the vessels due to spasm. The majority of attempts at producing functional spasm were unsuccessful. However, Westphal, using very large doses of pilocarpine subcutaneously, was able to produce acute gastric ulcers in rabbits. Of the many attempts made, his were the most successful, but, even so, they cast little light on the subject because of the failure to produce chronicity.

Two other methods were used following the theory of deficient blood supply to the gastric mucosa. They were the production of a general anemia and the production of portal insufficiency or interference with the portal circulation. Neither of these methods produced encouraging results, and the ideas were abandoned.

The role played by bacteria in the production of ulcer has received attention from many outstanding authors. Cruveilhier, however, was the first man to arouse interest in this phase of the problem. He theorized that peptic ulcer should be compared to intestinal typhoid ulcer. This theory, of course, precipitated a storm of criticism, but served the purpose of initiating experimental work on the part of the bacteriologists. It may be of interest to note, at this point, that one of the earliest methods of approach to this phase of the problem was the intravenous injection of pus.

In trying to evaluate the merits of the numerous experimental works using bacteria as the spearhead of their attacks, I have reached the conclusion that the work of Rosenow is the most significant. Up until the time that Rosenow became interested, the only work using living bacteria in pure culture had consisted of the ingestion of large numbers of Bacillus coli-communis, and this method had been nonproductive. Rosenow conceived the idea that virulent streptococci were the etiological agents, and attempted to produce ulcers by causing rabbits to ingest large numbers of streptococci. This attempt failed completely.

The next attempt made using bacteria consisted in the intravenous injection of living organisms. It was to this phase of the experimental work that Rosenow made a really outstanding contribution. Using dextrose brain broth as a culture medium, he cultured organisms from chronic ulcers and from various foci of infection in patients having chronic ulcers. Then, he injected these organisms, streptococci, in-

travenously in rabbits. The organisms cultured from the ulcers produced ulcers in 61 per cent of the cases, and the organisms cultured from the foci of infection in patients having ulcer produced ulcers in 28 per cent of the cases.

Rosenow also found that the incidence of ulcer was materially reduced by preliminary treatment of the rabbits with vaccine.

All of the ulcers produced in this manner tended to chronicity and perforation. This work was confirmed by Haden, Nickel and Hufford.

In considering the production of ulcers by the action of toxic agents, no really significant work could be found. All sorts and kinds of drugs have been used, also, biologic toxins. Workers in the Mayo Clinic have found that the ingestion of large amounts of cincophen produced ulcers in 100 per cent of a series of cases. Ulcers produced by these methods, however, have failed to live up to expectations as regards chronicity and the tendency to perforation.

The next etiological theory to be considered is that of trophic and glandular disturbances. This theory is a product, originally, of the Italian school. Ebstein and Brown-Sequard, however, were the first men to do any experimental work for which this theory was used as a basis. They were able to obtain ulcer formation in the stomach following circumscribed destruction of the anterior quadrigeminate bodies.

While working on another problem involving intracranial manipulations in dogs and cats, Keller noticed lesions in the stomach and small gut of a number of his animals at autopsy. Becoming interested in these lesions, he began a series of experiments following the lead of Ebstein and Brown-Sequard. In one series, Keller found that the ulcerative changes in the stomach and small gut followed lesions accompanied by hemorrhage into the ventricles or transverse lesions at the level of the chiasm unassociated with intraventricular hemorrhage. Multiple erosions in the stomach were encountered in 8 dogs at death 24-60 hours after operation, and in 3 cats at death, 1, 2, and 7 weeks after operation. These erosions were found to occur most frequently on the anterior and posterior surfaces of the body of the stomach, proximal to the pylorus, more numerous on the crests of the folds. Infrequently, the erosions occurred in the pylorus and proximal duodenum. In two instances, the erosions were associated with hyperemia and hemorrhage.

Keller felt that his previous work indicated some damage to the hypophysis, therefore he decided to investigate more thoroughly. He performed hypophysectomy on a series of 23 dogs and got the following results:

(1) Five dogs showed gastro-intestinal hemorrhage 24 hours after operation at death.

(2) Four dogs showed typical twin duodenal ulcers.

(3) One dog showed typical craters in the body of the stomach.

(4) Thirteen of the dogs upon whom vagotomy and sympathectomy of the abdominal chains had been done prior to the operation were not protected from ulcer formation. These ulcers were both acute and chronic.

From these results, Keller concluded that ulceration was caused not by lack of hypophyseal secretions, but by neighboring neural derangement.

Eppinger and Hess have shown that the parasympathetic system is disordered in peptic ulcer, and that an increase in vagus tone is usually present. In proof of this statement, they used drugs (principally belladonna) which reduced vagus tone and were able to ameliorate the symptoms which accompany ulcer.

The disturbance of glandular function as an etiologic factor has been supported by a number of men. O'Brien states that peptic ulcer has been successfully treated in a series of 9 cases by the injection of pituitrin subcutaneously, the action of the drug being to check gastric secretion and decrease peristalsis.

Another method used in the attempt to establish the etiological theory of glandular disturbance was the destruction of the suprarenal capsule. This method met with only partial success.

Recently Youmans noted the presence of ulceration of the stomach or duodenum in a small percentage of cases of known vitamin K deficiencies which were brought to autopsy. Although there is no definite link between vita-

min K deficiency and peptic ulcer formation, Youmans feels that further investigation is indicated along this particular line of thought.

The part played by the digestive juices in the production of peptic ulcers has been recognized since the time of Hippocrates. Saitta, in 1900, was the first man to attempt any experimental work in this line. Since 1900, however, any number of experiments have been performed, but of all in this class, the work of Frank C. Mann is outstanding.

Mann evaluates two factors in the production and prevention of healing of peptic ulcers as a result of his experimental observations, namely, the active chemical agent (acid) and the mechanical agent.

He advises that we remember that the ulcer usually occurs in the pyloric or duodenal mucosa which secretes alkali, but is exposed to an acid medium. Therefore, acid may be considered to be a direct or an indirect factor. The simulation of hyperacidity is very difficult by artificial administration of acid, since the upper portion of the intestinal tract produces and contains alkaline fluids in sufficient quantity to neutralize everything passing through the pylorus. Ulcer may then be the result of decreased alkaline secretions rather than of the overproduction of acid, or a combination of both conditions.

Mann found that damage to any one or elimination of the alkali producing mechanisms as a whole would, in the case of the former, produce a small per cent of ulcers, and in the case of the latter, also a small per cent of ulcers.

Working together, Mann and Williamson conceived the idea of exposing the jejunum to the full force of the gastric hydrochloric acid without the presence of any alkalinizing agents from the duodenum. In order to do this, they devised the following operation which they performed on dogs.

Technic:

(1) The pylorus is sectioned and the distal end closed.

(2) The first portion of the jejunum is sectioned and the distal end anastomosed to the pyloric opening of the stomach.

(3) The proximal end of the jejunum is drained into the ileum at a distance greater than 59 cm. from the pyloric anastomosis.

Following this operation, a typical chronic ulcer developed in 90 per cent of the cases. The time of development of these ulcers following the operations was from three weeks to four months. In order to satisfy himself as well as others, Mann asked and answered questions concerning these experimentally produced ulcers:

(1 Q) What relation are these ulcers to those occurring in man?

(A) They both have the same general gross and microscopic characteristics. Chronicity, which is of chief importance, is marked in both.

(2 Q) Are the ulcers due to malnutrition as a result of operation?

(A) There is an initial 10 per cent decrease in weight followed by a stationary phase and then a sudden drop when the ulcer develops.

(3 Q) Are the ulcers due to trauma?

(A) They never involve the traumatized areas.

Also, other operation in which the duodenal and gastric contents were emptied into the same loop of jejunum failed to produce ulcers, and when the same dogs were changed by the original procedure, the ulcers developed.

(4 Q) Are these ulcers such that they affect only the jejunum?

(A) Similar ulcers have been produced in the duodenum by transplantation of the common bile duct and the pancreatic duct to the terminal ileum, thus removing the greater portion of the alkaline secretions from the duodenum. Chronic gastric ulcers have never been produced consistently by any method.

The last factor to be considered as a possible cause of the production of ulcer is that of trauma to the mucosa.

Since most of the medical and surgical treatments have been designed with the object of protecting the lesions from chemical or mechanical injury, experimental work has been directed for the most part toward the study of these two factors.

Some of the suggested mechanical factors are as follows:

(1) Upsets in the motor activity of the stomach cause longer exposure to the acid.

(2) There is a nozzle-like action at the pylorus due to variation in the size of its opening, and the ulcer always develops opposite the point of greater force.

(3) The reduction of the propulsive power of the stomach by drugs cuts down the incidence of production.

Mann found that the incidence of production in the presence of hyperacidity increased when a coarse diet is fed to the experimental animal, but he believes that the two factors must exist together in the animal.

Fauley and Ivy found that a coarse diet retarded healing in the gastric ulcers of rabbits. They offered as additional proof of the value of the acid and mechanical factors the following two points:

(1) Protection from both produces remarkably rapid healing, the first indication being within 48-60 hours, the whole process occurring in less than 30 days.

(2) Treatment directed against these factors is far more effective than any other sort.

The management of uncomplicated ulcer patients has changed very little and consists primarily of frequent feedings with milk or milk substitutes, anti-spasmodics and sedatives freely when indicated, and some form of antacid therapy. Warren and his associates found that the peptic activity of the gastric secretions is definitely decreased with the administration of antacids, and that aluminum hydroxide exerts a much greater antipeptic effect on a given pH than does calcium carbonate and other antacid preparations.

Nye has advocated the use of potatoes in the dietary treatment of peptic ulcer for the following reasons: Few people are sensitive to potatoes; they have a high caloric value and a high content of vitamins A, B, and C, as well as minerals; the alkaline reaction of the potato helps to reduce gastric acidity; and the potato is an easily digested food.

In general, the use of tobacco is prohibited in most cases because of its effect of stimulation of the autonomic nervous system. In fact, many men feel so strongly that tobacco is detrimental that they refuse to treat patients with peptic ulcer who continue to smoke.

Levy and Siler have found that "amigen," an amino acid mixture, is an effective buffering agent when introduced into the stomach and have suggested its use in the management of bleeding peptic ulcers.

DeCourcy of Cincinnati has noted the similarity of the personality types in cases of hyperthyroidism and peptic ulcers. He suggests that since desiccated thyroid is fed postoperative to cases of hyperthyroidism on the theory that an adequate supply of circulating thyroid will obviate stimulation of the remaining gland tissue, hydrochloric acid given postoperative to ulcer cases will possibly reduce acid formation of the remaining acid-secreting cells.

Musser states that it is not so much what the patient eats as it is how he eats it and emphasizes the avoidance of stress with its disturbance of the autonomic nervous system and the subsequent effects of oversecretion of gastric juice and spasticity of the pylorus. In addition, Musser states that alcohol is allowed occasionally if the temperament of the patient so demands, but not to excess, although there is no basis in fact that alcohol is a direct causative agent of peptic ulcer.

In conclusion, it would seem that the definite etiological agent of peptic ulcer is still undetermined, and that further experimental work is indicated in at least all of the fields discussed in this paper. My personal opinion is that the experimental work done having the digestive juices as its basis offers the most productive field for further research. In addition, treatment from the medical standpoint has varied but little in the past 15-20 years, and a much more determined effort has been made to approach the problem of treatment from the standpoint of psychosomatic medicine.

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EDITORIAL DEPARTMENT

BLOOD CONTENT DURING CONVALESCENCE FROM FRACTURES

Certainly the fracture would appear to be a purely local disturbance. Yet as with furuncle or cancer, it sets up a chain of events which cause general body changes. Howard and associates[1], at Johns Hopkins Hospital, among others, have followed closely some of the blood chemical changes which occur during convalescence from fracture. Urinary lithiasis, they say, may be a complication. Roentgenographic pictures of limbs immobilized over long periods disclose marked rarefaction of the bones. If calcium and phosphorus salts are excreted into the urine during the rarefaction process, these substances may figure in the increased stone formation. The Hopkins group followed the excretion of calcium and phosphorus in blood and urine in a group of male fracture patients at bed rest in complete leg and partial body casts.

They observed a steady increase in urinary excretion of calcium which reached a peak in about a month, then remained level till about the period of mobilization, occasionally falling before mobilization. It is known that in healthy persons after fracture there is a rapid breakdown of tissue as shown by increased nitrogen excretion. Nitrogen excretion increases for approximately a week following fracture, then drops toward normal. It is at its lowest point when calcium excretion is at its highest.

The month long rise in calcium excretion and the subsequently maintained high level were not altered by increase in the amount of fluid which the patient took, or by sharp curtailment of fluid, nor did fluid variations alter the acid reaction of the urine. Alkalinization did not reduce calcium excretion. Addition of vitamin D_2 to the diet also failed to alter calcium excretion. Apparently the measures used did not induce calcium retention in an immobilized bone.

Variations of phosphorus metabolism were characteristic but less constant in the same group of patients. Phosphorus tended to rise in the urine as nitrogen excretion, or protein catabolism, rose, rather than as calcium rose; and it fell with the urinary nitrogen. Dietary changes, for example, increase of calcium or phosphorus in the ration, were reflected by changes in phosphorus excretion.

Inorganic phosphorus in the blood serum changed little after fracture. The serum calcium had a slight tendency to rise.

Howard and associates comment upon the reports of others that mere immobilization in casts of healthy young men causes a rise in the urinary calcium excretion; and that the nerve injury which accompanies immobilization of a paralytic limb after poliomyelitis is associated with speedy skeletal rarefaction and high excretion of calcium. Muscle use apparently is essential to normal bone structure. Work of this type emphasizes the importance of general care of fracture patients, with more than adequate feeding to provide for the protein and mineral loss; and the earliest possible mobilization of fractures to save bone.

This is important work upon the systemic and metabolic changes, which characterize fracture convalescence, study of which may hasten the healing process.

1. Howard, John Eager; Parson, William; and Bigham, Roy S.: Studies on Patients Convalescent from Fracture. III. The Urinary Excretion of Calcium and Phosphorus. Bull. Johns Hopkins Hosp., 72:291 (Oct.) 1945.

THIOURACIL IN ANIMAL HUSBANDRY

Since practically all that is good in modern medicine has come from investigations upon living animals and fowl and lower organisms, the departments of agriculture of large uni-

versities have made many important contributions to medical progress. Clinical nutrition in particular owes much to the educational groups established originally to help the farmer. New antiseptics, hormones, vitamins, stimulants, discovered or tried in the divisions of plant and animal husbandry, have proved important to physicians.

Studies even upon bacterial metabolism, such as the requirement of a microorganism for a vitamin, have also contributed to clinical progress. Folic acid, effective in control of pernicious anemia, sprue, and other forms of macrocytic anemia, was isolated as a factor necessary for growth of Lactobacillus casei.[1] Recent work which shows that injury of a nerve in a certain species of insect results in development of tumors in the insect's alimentary tract, may have profound significance in the study of the etiology of human tumors.[2]

Sanitation and modern dietary knowledge have made possible large scale production of animals and fowl for human food. There is a continual demand for new varieties of domestic animals, for better flavor or more economical production for market. The varieties have been derived chiefly by careful breeding, but chemicals and endocrines have long been a temptation to breeders, who would like to increase milk, egg or meat production in quick order by the injection of hormones, x-radiation, or feeding.

Since the thyroid gland controls the activity of the animal in large measure, there have been many attempts to produce hypothyroid animals, which would gain weight rapidly with an economical ratio of meat gain to feed requirement. Rapid gain of steers has been reported following partial thyroidectomy. Thiouracil, which is used clinically in the treatment of hyperthyroidism, has been administered to young chickens in the hope of depressing the thyroid and producing broilers for market more economically. In the quantities employed, the drug caused a slowing of growth rather than more rapid gain of broilers.

Investigators[3] in the Department of Agriculture of the University of Missouri studied the same problem in swine. Two-tenths per cent thiouracil was added to the diet of the pigs to depress the metabolic rate and it was noted that after 28 days they were less active, and were shorter and fatter than the controls. They gained weight more rapidly and more economically, as was desired. The gain was not true growth, since they were wider and shorter than the controls. Probably the skeletal weight was less. The animals spent a great deal of their time sleeping. Apparently the pigs' contours were considerably altered by thiouracil feeding.

Thiouracil would seem to affect different species of animals differently, and possibly different breeds within a species. Further studies will be needed to determine its values in stock raising.

Thiouracil acts by interference with the supply of iodine of the thyroid gland. One wonders whether merely a lowering of the proportion of iodine in the ration might have the same depressing effect upon the gland, and avoid the sometimes toxic effects of thiouracil.

PENICILLIN AND FEVER THERAPY

Marvelous results in control of infection have characterized the last decade of sulfonamide and penicillin therapy. Bacteria hitherto invulnerable have been destroyed and many miracles of sterilization wrought. The physician is still struggling to complete the conquest of pathogenic micro-organisms, of which a few resistant ones remain. The sulfonamides have been greatly improved for clinical use. New antibiotics are constantly being discovered, though added slowly to the list of accepted remedies. At times a combination of penicillin and sulfonamide will sterilize the blood stream where neither alone would be effective.

The greatest field of penicillin has lain in the group of venereal diseases. Penicillin has been suggested as an improvement over silver nitrate for gonorrheal prophylaxis in the eyes

1. Spies, Tom D.; Vilter, Carl F.; Koch, Mary B.; and Caldwell, Margaret H.: Observations of the Anti-Anemic Properties of Synthetic Folic Acid. Sou. Med. J., **38**:707 (Nov.) 1945.

2. Scharber, B.: Experimental Tumors After Nerve Section in an Insect. Proc. Soc. Exper. Biol. and Med., **60**:184 (Nov.) 1945.

3. Muhrer, M. E.; and Hogan, A. G.: Effect of Thiouracil on Growing Swine. Proc. Soc. Exper. Biol. and Med., **60**:211 (Nov.) 1945.

of the newborn.[1] In syphilis it is unsurpassed in the speed and certainty of its action. There are, however, cases that do not yield or that suffer relapse. In some of these the addition of fever therapy is suggested.

It has been variously reported that penicillin activity *in vitro* is low at low temperatures, and high at temperatures favoring greatest growth of the organism. This is possibly concerned with the fact that penicillin activity is greatest against organisms which are undergoing division. In tests against Staphylococcus aureus,[2] its effectiveness rose as the temperature was elevated from 37° Centigrade, to 39° and to 42°.

Workers from the Chicago Board of Health and the United States Public Health Service have investigated the effects of penicillin combined with fever therapy in early syphilis.[3] Fever with arseno-bismuth preparations had been employed by them with good results in early syphilis; however, toxic reactions were not uncommon. Since the toxicity of penicillin is negligible, it was thought advisable to try this agent with fever therapy instead of the arsenic-bismuth combinations. Varying doses of penicillin were employed. Fever and penicillin were found to give few disturbing reactions, and the patient under this treatment was much more comfortable than under fever with arsenic and bismuth. The use of 600,000 units of penicillin plus three hours of fever at 106° F. rectal, was inadequate, and resulted in 80 per cent relapses. If the dosage of penicillin was increased, much better results were obtained. Indications seem to be that if 1,200,000 units of penicillin are employed with the same period of fever, the relapse rate will not be more than 15 to 20 per cent. Further studies are to be made.

Since much larger quantities of penicillin are now recommended for syphilis when the drug is used alone, and penicillin is believed to be one of the least toxic drugs employed in this disease, perhaps even the above amount, 1,200,000 units, will be increased for use with fever. Results will of course await investigation. Careful studies must be made to compare large dosage penicillin therapy with and without superimposed fever.

1. Bloxsom, Allan: Penicillin Locally in the Eyes of New Born Infants to Prevent Ophthalmia Neonatorum. J. Pediat., **27**:447 (Nov.) 1945.

2. Lee, S. W.; and Foley, E. J.: Effect of Temperature on the Action of Penicillin in Vitro. Proc. Soc. Exper. Biol. and Med., **60**:133 (Oct.) 1945.

3. Craig, R. M.; Schwemlein, G. X.; and Kendell, H. Worley: Penicillin Combined with Fever Therapy. A Preliminary of Twenty Cases of Early Syphilis. J. Lab. and Clin. Med., **30**:1016 (Dec.) 1945.

TWENTY-FIVE YEARS AGO

From Journals of 1921

Physicians and Whiskey.[1]—Much has been made of the claim that the adoption of Federal prohibition has seriously interfered with the use of whiskey for medicinal purposes by physicians * * * In twenty-four states, under the Volstead act, permits to prescribe whiskey can be issued to physicians * * * In these twenty-four states * * * only twenty-nine per cent * * * of the physicians * * * have taken out permits * * * Evidently the remaining seventy-one per cent do not regard whiskey as of enough value to go to the trouble of taking out a permit.

Evaluation of Vaccine Therapy by the Discoverer of Penicillin.[2]—I have been practising vaccine therapy since it was in its infancy, and as time goes on I find myself more and more convinced of its efficacy, not only for the more severe cases which are to be seen at a hospital but also and more especially for the lesser ailments * * * with which the practitioner has much to do * * * I shall confine myself to putting before you the clinical aspects of vaccine therapy * * * the treatment by vaccines of certain conditions * * *

Usually the first beneficial effect following the administration of a vaccine is a feeling of well being in the patient * * * When small doses are used this may follow within an hour or two * * * the beneficial result may be manifest in a few hours * * * Where the infection is a chronic one * * * for example, sycosis or furunculosis * * * the dose should be rapidly increased * * * In acute infections * * * for example, bronchopneumonia, erysipelas * * * the initial dose should be smaller * * * In catarrhal infections of the respiratory tract * * * polyvalent mixed vaccines have met with very great success * * *

The mixed stock vaccine (0.2 c. cm.) should be given immediately the "cold" is noticed * * * Even when the cold has developed, vaccine will generally cut short the attack * * *

Influenza.—* * * There are many different combinations of anti-influenza vaccine on the market * * * the best is the one which we prepare which contains 500 million Pfeiffer's bacillus per c. c. with 1000 million pneumococci and 100 million streptococci * * *

Pneumonia.—* * * There seems to be no doubt that

1. Editorial. Medicinal Use of Whiskey. J.A.M.A., **76**:524 (Feb. 19) 1921.

2. Fleming, Alexander: Vaccine Therapy in Regard to General Practice. Brit. Med. J., p. 255 (Feb. 19) 1921.

the administration of vaccine aids the resolution of the pneumonia and hastens recovery * * *

Whooping Cough.—* * * For * * * treatment * * * a mixed vaccine should be given * * *

Chronic Rheumatic Conditions.—* * * rheumatoid arthritis, fibrositis, neuritis, sciatica, myositis, and similar complaints * * * all seem to take their origin from some chronic infection which is usually streptococcal * * * The effect in such cases of the administration of vaccines, either autogenous or stock, has been that in almost all there is some alleviation of the condition and in some there is complete disappearance of the disease * * *

Diphtheria Carriers.—* * * by the administration of a vaccine the diphtheria bacilli can be got rid of in a * * * shorter time than by any other means * * *

Vaccine therapy is applicable to many conditions * * * local tubercle, acne, staphylococcal infections such as boils or carbuncles, streptococcal infections such as erysipelas or pyorrhea, and many others have been successfully treated * * * I need not weary you with recital of the merits of vaccines in these conditions which have been treated in this way for many years.

Symptoms.[3]—I am obliged to Sir James MacKenzie for kindly replying to my question * * * Sir James gives as a possible definition of a symptom "the reaction of the tissue to an injurious agent." But is this not rather a definition of disease? A symptom I take to be an indication of the existence of disease in the living subject which is quite a different thing, is it not? My difficulty is to distinguish between signs and symptoms * * * The term "symptom" is not sufficiently comprehensive * * * Why not abandon it in favour of the wholly unambiguous term, "sign."

3. Campbell, Harry: Correspondence. Brit. Med. J., p. 283 (Feb. 19) 1921.

Book Reviews

Familial Nonreaginic Food-Allergy. By Arthur F. Coca, M.D., Medical Director, Lederle Laboratories, Second Edition. 191 pages, with illustrations. Springfield: Charles C. Thomas, 1945. Price $3.75.

This, the second edition of Dr. Coca's little book is so extensively rearranged and rewritten as to constitute practically a new volume. The subject matter is the same but the handling somewhat different and simplifications are suggested, in his test for allergic sensitivity for foods by increases in pulse rate.

Dr. Coca also discusses a possible connection between food sensitivity and several other diseases: arterial hypertension, common colds and cancer of the breast.

In this edition he further enriches the terminology of medicine by introduction of a new word, "idioblapsis" for the longer designation of familial nonreaginic food allergy. "Idioblapsis" with its adjectival form "idioblaptic" is a new word in medicine whose conception and derivation are discussed.

The little book is easy reading and will constitute a worthwhile addition to the library of all interested in the complicated subject of allergy.

The Examination of Reflexes: A Simplification. By Robert Wartenberg, M.D. Foreword by Foster Kennedy, M.D. 222 pages. Chicago: The Year Book Publishers, Incorporated, 1945. Cloth, $2.50.

One might be inclined to think that a whole book on reflexes would be much ado about nothing. This is far from true. The whole medical profession should take seriously what is said, and be very thankful for the simplification of an extremely technical subject.

The physiological muscle reflex is a normal protective mechanism. The real cause of a deep reflex is a muscle stretch and should not be designated as tendon, bone, periosteal, osteoperiosteal, osteotenderness, joint, fascial or aponeurotic reflex as these anatomic parts alone have no reflex power. A second large group of reflexes are called superficial or "skin" reflexes. Such a reflex is not a muscle stretch reflex, not a muscle muscle reflex but a skin-muscle reflex. It is not a direct but an indirect muscle reflex; it is not intrinsic but extrinsic, or one might say "referred." It is not always local but may be distant.

Perhaps no reflex has caused more discussion than the "plantar muscle reflex." The author devotes forty pages of this monograph to its discussion with a one page illustration. Its explanation in his own words: "The points on the surface of the foot indicate the places from which a tap with the reflex hammer can produce a plantar flexion of the toes. Names of the authors who described these reflexes and year of publication are shown. Many of these reflexes indicated are named for their discoverers. All of the twenty reflexes indicated here represent the same reflex—the plantar muscle reflex—as it may be elicited from different points."

Some twenty pages are devoted to abdominal skin and muscle reflexes. These two battle grounds, after the smoke has cleared away, are made quite simple with the explanation of the many ways to obtain the same result.

This monograph should be carefully read by everyone who makes an up-to-date diagnosis. The deep and superficial reflexes must be known and practiced if one is to make a complete physical examination. The tendency for certain surgeons to operate for every stomachache without full diagnostic investigation has caused much suffering to the patient and humiliation to the surgeon. The simple taking of the pupillary reflexes and knee jerks would have saved many a patient in a tabetic crisis, from an abdominal section.

This is an extremely important contribution to medical literature. The author has given the basic principles and without offense deflated an extensive literature of much human vanity.

Southern Medical News

SOUTHEASTERN SURGICAL CONGRESS

The Southeastern Surgical Congress will hold its next Assembly at Memphis, Tennessee, Peabody Hotel, March 11-13. The medical profession is invited to attend. For program and further information write to Dr. B. T. Beasley, Secretary-Manager, Atlanta 3, Georgia.

DALLAS SOUTHERN CLINICAL SOCIETY

Dallas Southern Clinical Society will hold its Fifteenth Annual Spring Clinical Conference at Dallas, Texas, Hotel Adolphus, March 18-21. There will be thirteen guest speakers, clinics by local physicians, round-table luncheons, exhibits, etc. Registration fee of $10.00 covers all Conference activities. For program and further information write to Executive Secretary, Dallas Southern Clinical Society, 433 Medical Arts Building, Dallas 1, Texas.

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

New Orleans Graduate Medical Assembly, Ninth Annual Meeting, will be held in New Orleans, Municipal Auditorium, April 1-4. The program will consist of lectures by sixteen outstanding guest speakers, clinics, symposia, clinico-pathologic conferences, round-table luncheon discussions and technical exhibits. Registration fee of $10.00 covers all features, including three luncheons. Physicians who plan to attend are invited to register at once with the Secretary, Room 105, 1430 Tulane Avenue, New Orleans 13, Louisiana. Information regarding hotel reservations will be sent upon receipt of registration fee or by request.

ORIENTATION COURSE IN ALLERGY

The American Academy of Allergy, under the sponsorship of the Louisiana State University School of Medicine, will give a five-day orientation course in allergy in New Orleans, March 8-12. Roosevelt Hotel will be headquarters. The faculty will be made up of nationally recognized allergists. For further information address the Office of the Dean, Louisiana State University School of Medicine, 1542 Tulane Avenue, New Orleans 13, Louisiana.

SPRING GRADUATE COURSE

The Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Virginia, will hold its Nineteenth Annual Spring Graduate Course in Ophthalmology, Otology, Rhinology, Laryngology, Facio-Maxillary Surgery, Bronchoscopy and Esophagoscopy, April 1-6, at Roanoke. For program and further information write Dr. Elbyrne G. Gill, 711 South Jefferson Street, Roanoke, Virginia.

OPHTHALMOLOGICAL SEMINAR

Emory University will hold an Ophthalmological Seminar at the Atlanta Biltmore Hotel, Atlanta, Georgia, April 4-6, honoring the memory of Dr. Abner Wellborn Calhoun. All ophthalmologists are cordially invited as guests of Emory University. Hotel reservations should be made early.

ALABAMA

The Medical College of Alabama, Birmingham, held on January 22-25 the first session of its annual post-graduate seminar which was devoted to obstetrics and gynecology. The second session, devoted to medicine and pediatrics, will be held February 19-22; and the third session, devoted to surgery, will be held March 26-29. Dr. Roy R. Kracke, Dean of the Medical College, stated that every resource of the College will be used for support of the seminar. In addition to the scientific instruction, the visiting physicians will be shown what the Medical College has to offer medical students, nurses, the profession and citizens of the state.

Birmingham physicians who have recently been released from military service and returned to practice are: Dr. Ralls M. Coston, Dr. Raymond R. Callaway, Dr. Joe Donald, Dr. Edgar Givhan, Dr. Huey Green, Dr. Sigmond A. Kahn, Dr. Julius E. Linn, Dr. Wilmot S. Littlejohn, Dr. W. H. Long, Dr. L. C. Posey, Dr. Marion T. Davidson, and Dr. Jas. S. Snow.

Dr. Hiram Robertson Elliott Jr., Fairfield, and Miss Naomi Favor, Selma, were married recently.

DEATHS

Dr. Emit Luther McCafferty, Mt. Vernon, aged 68, died January 14.

Dr. Henry Young Harper, Oak Hill, aged 37, died January 12.

ARKANSAS

DEATHS

Dr. Robert Booth Moore, Little Rock, aged 57, died recently of lymphosarcoma.

Dr. Harry B. Smith, Keo, aged 70, died recently of chronic nephritis.

DISTRICT OF COLUMBIA

Dr. George F. Lull, Major General, Medical Corps, U. S. Army, The Deputy Surgeon General, Washington, whose notable service won for him the highest noncombatant award, the Distinguished Service Medal, has retired from the Army after thirty-three years of service. Dr. Lull will become Secretary and General Manager of the American Medical Association, Chicago, upon the retirement of Dr. Olin West in July. He has already joined the staff of the American Medical Association to familiarize himself with the work of the organization.

The Medical Society of St. Elizabeths Hospital, Washington, has installed Dr. Robert H. Groh, President; Dr. William G. Cushard, Vice-President; and Dr. George D. Weickhardt, Secretary-Treasurer.

Woman's Medical Society of the District of Columbia, Washington, has elected Dr. Ella Enlows, President; Dr. Grace G. Purse, Vice-President; Dr. Paula R. Kaiser, Recording Secretary; Dr. Cecile L. Fusfeld, Corresponding Secretary; and Dr. Elizabeth S. Kahler, Treasurer.

Georgetown University School of Medicine, Washington, has promoted Dr. Henry R. Schreiber, Clinical Professor of Medicine, to Professor and Acting Director of the Department of Medicine, upon the resignation of Dr. Wallace M. Yater; Dr. William F. O'Donnell to Professor and Acting Director of the Department of Pediatrics, succeeding Dr. Joseph S. Wall, who resigned after forty-seven years a member of the faculty; and has named Dr. Charles A. Millwater, Associate Professor of Clinical Pediatrics, succeeding Dr. John H. McLeod, resigned.

Dr. Joseph T. Roberts, Adjunct Clinical Professor of Medicine, Georgetown University School of Medicine, Washington, was chosen the Davidson Lecturer of the Medical Society of the District of Columbia in 1945, his paper submitted in the competition to select the lecturer being on "The Role of the Small Vessels and Nerves of the Heart in Heart Failure and Cardiac Pains."

Dr. Hugh S. Cumming, Washington, upon the completion of his twenty-fifth year as Director of the Pan American Sanitary Bureau, was granted a gold medal by the Republic of Guatemala. Dr. Cumming has served forty-two years as a member of the U. S. Public Health Service, having served sixteen years as Surgeon General, retiring from that position in 1936.

Dr. Joseph S. Wall and Dr. Wallace Mason Yater, Washington, were given a testimonial banquet by the Senior Class of Georgetown University School of Medicine on November 19, 1945, upon their resignation from the faculty of the School. Black and white portraits of Dr. Wall and Dr. Yater, done by one of the students, was presented to them and autographed by all present.

Dr. S. Ross Taggert, Lieutenant Colonel, Medical Corps, U. S. Army, Washington, was recently appointed by the District Commissioners to succeed Dr. Frederick G. Gillick as Director of the Health Department's Venereal Disease Bureau.

Garfield Hospital, Washington, will receive between $150,000 and $200,000 as residuary legatee of the estate of Mrs. Alice G. Brandeis, who died recently, the bequest in memory of the late Supreme Court Justice Louis D. Brandeis.

Dr. Shelley U. Marietta, Major General, Medical Corps, U. S. Army, and Commanding General of Walter Reed Hospital, Washington, has been awarded the Distinguished Service Medal.

Honorary Consultants to the Army Medical Library held its second annual meeting in Cleveland, Ohio, recently and elected Dr. John F. Fulton, New Haven, Connecticut, President; Dr. Chauncey D. Leake, Galveston, Texas, Vice-President; Colonel Harold W. Jones, Washington, Secretary-Treasurer; and Major General George F. Lull, Washington, a member of the Executive Committee.

DEATHS

Dr. Fred Repetti, Washington, aged 70, died recently.

Dr. Margaret Barclay Wilson, Washington, aged 82, died recently of acute congestive heart failure.

FLORIDA

Dr. Hart E. Van Riper, Medical Director, James M. Jackson Memorial Hospital, Miami, has been appointed Assistant Medical Director of the National Foundation for Infantile Paralysis as Assistant to Dr. Don W. Gudakunst, New York, Medical Director. Dr. Van Riper will supervise the Foundation's extensive program of medical care and treatment for infantile paralysis patients throughout the United States.

Dr. Walter E. Wilkins, U. S. Public Health Service, Raleigh, North Carolina, has been directing a program endorsed by the Alachua County Medical Society to test all school children in the county to determine the cause of borderline anemia.

Dr. Leland H. Dame, Sebring, has been appointed Health Director, Orange County, succeeding Dr. William P. Rice, resigned.

Dr. Charles G. Hedges, Vallejo, California, has been appointed Superintendent, Jackson Memorial Hospital, Miami.

Deaths

Dr. John Wesley Calhoun Stephenson, St. Petersburg, aged 60, died recently of coronary occlusion.

Dr. Smith Lanier Turner, Williston, aged 59, died recently of acute dilatation of the heart following an operation for gangrenous gallbladder.

GEORGIA

Eighth District Medical Society has elected Dr. J. A. Leaphart, Jesup, President. Serving with him are Dr. W. W. Turner, Nashville, Vice-President; and Dr. G. T. Crozier, Valdosta, Secretary.

Royston will have constructed a modern hospital by a $250,000 gift from Ty Cobb as a memorial to his parents who were born and reared in Royston.

Emory University, Atlanta, has announced the establishment of a Department of Physical Medicine at its hospital and the start of a five-year program in the specialty for Atlanta and the Southeast under a grant of $167,000 from the National Foundation for Infantile Paralysis. The Department will be operated by Emory University School of Medicine under the direction of Dr. Robert L. Bennett, Director of Physical Medicine at Georgia Warm Springs Foundation and newly appointed Professor of Physical Medicine at the Medical School faculty. Dr. Bennett will divide his time between Warm Springs and Atlanta.

Dr. Richard Hugh Wood has been appointed Associate Professor of Medicine at Emory University Medical School and Physician-in-Chief at Emory University Hospital, Atlanta.

Dr. William B. Harrison, Medical Director of the Northeastern Medical Region, Gainesville, has been named Assistant Director of the Division of Maternal and Child Health of the Georgia State Department of Health; and Dr. Harald M. Graning, San Francisco, California, has been assigned by the U. S. Public Health Service to serve with the State Health Department as Assistant Director of local health organizations.

Georgia physicians who have recently been released from military service and returned to practice are: Dr. E. A. Roper, Jasper; Dr. A. O. Linch, Dr. B. Russell Burke, Dr. Tully T. Blalock, Dr. Needham B. Bateman and Dr. Hugh Hailey, all of Atlanta; Dr. F. Bert Brown, Dr. Joseph Pacifici and Dr. Jacob Rubin, all of Savannah; Dr. T. A. Futch Jr., Thomasville; Dr. Warren C. Baxley, Blakely; Dr. J. Dorman Turner, Nashville; Dr. Philip R. Stewart, Monroe; and Dr. Charles N. Wasden, Macon.

Milledgeville State Hospital, Milledgeville, hopes to increase the medical staff from twenty-one to fifty physicians as rapidly as trained personnel can be obtained. Dr. B. B. Bagby Jr., Richmond, Virginia, has come to the mental hospital to head the tuberculosis program.

Dr. Fred G. Hodgson, Dean of Orthopedics, Emory University School of Medicine, Atlanta, has been appointed Orthopedic Consultant of the Crippled Children's Division of the State Welfare Department.

Dr. I. B. Cantor, Atlanta, has been taking post-graduate work at Cook County Hospital, Chicago, Illinois.

Dr. William B. Armstrong, Atlanta, has reopened his office in the Doctors Building, practice limited to ear, nose, throat, and endoscopy.

Dr. Ann McHenry Hopkins, who has practiced medicine in Boston for the past seven years, has opened an office in Savannah. She will be part-time resident physician at Telfair Hospital.

Dr. C. H. Allen, Bremen, has been appointed the Central of Georgia Railway surgeon, succeeding the late Dr. Eugene Sanford, Buchanan.

Dr. Robert E. Peck, Atlanta, has opened offices in the Doctors Building, practice limited to neurology and psychiatry.

Dr. Nelson Augustus Bryan, Toccoa, has resigned as physician of the LeTourneau Clinic, Toccoa, and has returned to Shanghai and Hwanghsein, Shantung Province, China, as a medical missionary of the Southern Baptist Mission Board.

Dr. William J. Pendegrast, Atlanta, has opened offices in the Doctors Building for the practice of surgery and is associated with Dr. Wm. Ferrin Nicolson and Dr. Charles S. Ward.

Dr. James Wright Pilcher has moved from Canton to Wrightsville where he will be associated with Dr. Herschel B. Bray in the practice of medicine and surgery.

Dr. James I. Weinberg, Atlanta, has opened offices with practice limited to internal medicine.

Dr. Patricia Dodd, Savannah, has been named Resident Physician at the Georgia Infirmary.

Dr. David L. Salmon, Madison, Kentucky, has opened his office in the Buckhead Theatre Building, practice limited to eye, ear, nose and throat.

Deaths

Dr. Agnew Hodge Hilsman, Albany, aged 69, died recently of pulmonary emphysema.

Dr. Charles Marcellus Mashburn, Atlanta, aged 55, died recently of chronic pyelitis.

Dr. Robert Mayhue Ware, Fitzgerald, aged 62, died recently following a heart attack.

KENTUCKY

Darnall General Hospital, Danville, was released on January 1 by the Army which will be offered to the Veterans Administration or to the former owners.

Dr. Joseph P. Holt, Assistant Professor in the Department of Physiology, University of Louisville School of Medicine, Louisville, has been appointed Director of Medical Research, Standard Oil Company of New Jersey, with offices in New York.

Dr. George M. McClure, Jr., has been appointed a member of the Danville Board of Education.

Dr. George M. Wells, Bowling Green, has returned to the directorship of the Warren and Simpson County Health Departments, succeeding Dr. Paul Q. Peterson, who has been granted a scholarship in public health at the University of Michigan.

Dr. Raymond E. Wehr, Newport, who has been Acting Health Officer of Campbell County since the death of Dr. Clayton W. Shaw, Alexandria, has been named Health Officer.

Dr. Frank K. Sewell, Jackson, has been named Health Officer for the Knox, Whitley and Laurel County Health District, succeeding Dr. Richard B. Fulks, Barbourville.

Dr. Charles D. Cawood, Lexington, has resigned as Health Officer of the Lexington-Fayette County Health Department.

Dr. Wilber V. Brawshaw Jr., Stanford, succeeds Dr. Bertha A. C. Wiseman as Health Officer of Shelby County.

Deaths

Dr. John Grigsby Clem, Louisville, aged 65, died recently of coronary occlusion.

Dr. John G. Wynns, Sturgis, aged 68, died recently of heart disease.

LOUISIANA

Louisiana State Medical Society will hold its next meeting in Alexandria, May 6-8.

Tulane University of Louisiana School of Medicine, New Orleans, has appointed Dr. William B. Wendell, Ph.D., Associate Professor of Chemistry, University of Tennessee College of Medicine and School of Biological Sciences as Professor and head of the Department of Biochemistry; and Dr. Champ Lyons, formerly a member of the staff of Harvard Medical School and recently Consultant to the Secretary of War, Hemolytic Streptococcus Commission, as Associate Professor of Surgery.

Dr. David R. Womack and Dr. Jack E. Strange, New Orleans, were recently elected Commander and Chaplain respectively in the Ernie Pyle Post of the American Legion.

Dr. Gretchen Squires, New Orleans, has assumed the position as Director, Pathology and Clinical Laboratory of the Pensacola Hospital, Pensacola. She also maintains a full time private practice in clinical pathology.

Louisiana physicians who have recently been released from military service and returned to practice are: Dr. Robert E. Rougelot, Dr. Anthony J. Italiano, Dr. L. S. Charbonnet Jr., Dr. Edwin R. Guidry, Dr. W. Robyn Hardy, Dr. John S. Herring, Dr. Charles B. Odom, Dr. Cosmo J. Tardo, Dr. J. O. Weibaecher Jr., Dr. Joseph A. Sabatier Jr., Dr. Malcolm P. Schwarzenbach, Dr. Pascal L. Danna, Dr. Morris Shushan, Dr. Zachary J. Romeo, Dr. James S. Webb, Dr. Harry Meyer, Dr. Joseph D. Landry, Dr. Warren L. Rosen, Dr. Clarence A. Bishop, Dr. Richard E. Selser, Dr. Horace L. Wolf, Dr. Conrad G. Collins and Dr. Mims Gage, all of New Orleans.

Continued on page 66

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APRIL 15-20 ..... DISEASES OF NERVOUS SYSTEM

APRIL 22-27 ..... NUTRITIONAL and METABOLIC DISEASES

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MAY 20-25 ..... TRAUMATOLOGY

For detailed information write

DIRECTOR

Department of Graduate Medicine

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Continued from page 190

DEATHS

Dr. Lewis Beauregard Newsom, West Monroe, aged 83, died recently of senility.

Dr. Dalton Harris Trepagnier, New Orleans, aged 66, died recently of coronary thrombosis.

Dr. Olen L. Wise, Forest, aged 62, died recently.

Dr. Theodore John Dimitry, New Orleans, aged 66, died recently.

MARYLAND

Baltimore City Medical Society has elected Dr. Alfred Blalock, President; Dr. Charles Reid Edwards, Vice-President; Dr. Samuel McLanahan, Secretary; Dr. J. Albert Chatard, Treasurer.

Dr. H. Warren Buckler, Baltimore, recently resigned as Chief of the Division of School Hygiene of the Baltimore City Health Department after forty years of service.

Dr. J. Albert Chatard, Baltimore, recently resigned as School Physician at the Gilman Country School after forty years of service.

Mount Hope Retreat, Baltimore, is undergoing a reorganization for an extension of service for mental care, the name being changed to The Seton Institute. The Medical Advisory Board consists of Dr. Wendell S. Muncie, Baltimore, Chairman; Dr. Horace K. Richardson, Baltimore, Secretary; Dr. Lewis B. Hill, Baltimore; Dr. Arthur J. Lomas, Lutherville; Dr. Ralph C. P. Truitt, Baltimore; and Dr. Esther L. Richards, Baltimore.

Dr. Stephen E. Muller, Baltimore, Captain, Medical Corps, U. S. Army, was recently awarded the Bronze Star.

Dr. William F. Gassaway, Ellicott City, Major, Medical Corps, U. S. Army, was recently awarded the Bronze Star.

Dr. Jack R. Jarvis, Towson, and Miss Mary Irene Grace were married recently.

DEATHS

Dr. Nicholas William Bonelli, Baltimore, aged 43, died recently of meningococcemia.

Dr. Shepherd Drain, Baltimore, aged 68, died recently of carcinoma of the bowel.

Continued on page 68

THE NEW YORK POLYCLINIC

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Continued from page 66

Dr. Benjamin Pushkin, Baltimore, aged 56, died recently of coronary thrombosis and cardiovascular disease.

Dr. John King B. E. Seegar Sr., Baltimore, aged 76, died recently of carcinoma of the stomach.

Dr. Frederick William Taylor, Baltimore, aged 83, died recently.

MISSISSIPPI

Foster General Hospital, Jackson, was released on January 1 by the Army and will be offered to the Veterans Administration or to the former owners.

Dr. Lillian L. Nye, formerly of St. Paul, Minnesota, has been appointed head of the health service of the Mississippi State College for Women, Columbus.

Physician members of the Mississippi Children's Code Commission, recently appointed by the governor, are: Dr. Taswell P. Haney, Jr., Laurel; Dr. Charles B. Mitchell, Whitfield; Dr. Felix J. Underwood, Jackson; Dr. Estelle A. Magiera, Jackson; Dr. Virginia F. S. Howard, Jackson; and Dr. Henry C. Ricks, Jackson. The Commission consists of eighty members representing medical, legal, teaching, civic and service organizations.

Dr. Thomas E. Wilson, Jackson, has returned to private practice in the Medical Clinic Building, specialty limited to internal medicine and cardiology.

Northeast Mississippi Thirteen Counties Medical Society has elected Dr. J. Rice Williams, Houston, President.

Dr. Longstreet Cavett Hamilton, Jackson, and Miss Johnette Blackledge, Laurel, were married recently.

DEATHS

Dr. Charleston F. Hester, Newton, aged 61, died December 11, 1945.

Dr. William Arthur Toomer, Tupelo, aged 61, died recently of a heart attack.

MISSOURI

Mississippi Valley Medical Society will hold its eleventh annual meeting in St. Louis, September 25-27, at the Hotel Jefferson. There having been no 1945 meeting, the officers of the society have been retained for another year: Dr. Grayson L. Carroll, St. Louis, President; Dr. Walter A. Sternberg, Mount Pleasant, Iowa, President-Elect; Dr. Louis H. Jorstad, St. Louis, Dr. Elmer E. Nystrom, Peoria, Illinois, and Dr. Ernest J. Lessenger, New London, Iowa, Vice-Presidents; and Dr. Harold Swanberg, Quincy, Illinois, Secretary-Treasurer.

Dr. Howard A. Rusk, St. Louis, is Associate Editor of the *New York Times*.

Dr. Daniel W. Myers, St. Louis, Lieutenant Colonel, Medical Corps, U. S. Army, has been awarded the Legion of Merit.

Dr. Lee D. Cady, St. Louis, Colonel, Medical Corps, U. S. Army, has been awarded the Croix de Guerre with Palm.

Dr. James Barrett Brown, Colonel, Medical Corps, AUS, has been assigned to the Office of the Surgeon General, Washington, as Senior Consultant in Plastic Surgery.

Dr. Milton A. Spitz, St. Louis, has opened his office for the practice of internal medicine.

Dr. Guerdan Hardy, who has been released from military service, has returned to St. Louis for the practice of his specialty, ear, nose and throat.

Dr. Wilma R. Farrington, St. Louis, and Mr. Delmar O. Shields, Detroit, Michigan, were married recently.

Dr. Magda E. Puppendahl, St. Louis, and Mr. Brian T. Shorney, Detroit, Michigan, were married recently.

Dr. Terry E. Lilly Jr., Kansas City, and Miss Lillian Ethel Townsend were married recently.

DEATHS

Dr. Charles Lee Beeching, Kansas City, aged 63, died recently of coronary occlusion and hypertrophic arthritis.

Dr. George Henry Greenwood, Fredericktown, aged 83, died recently of cerebral hemorrhage.

Dr. William Leroy Kenney, St. Joseph, aged 72, died recently of cerebral hemorrhage.

Dr. William Henry Musgrove, Wheeling, aged 74, died recently of cerebral thrombosis.

Dr. Claude Earl Stump, Kansas City, aged 63, died recently.

Dr. John Francis Swarens, Kansas City, aged 78, died recently of coronary occlusion.

Continued on page 70

ALCOHOLICS ARE SICK PEOPLE
A GUIDE ON ALCOHOLISM FOR SOCIAL WORKERS

Robert V. Seliger, M.D.

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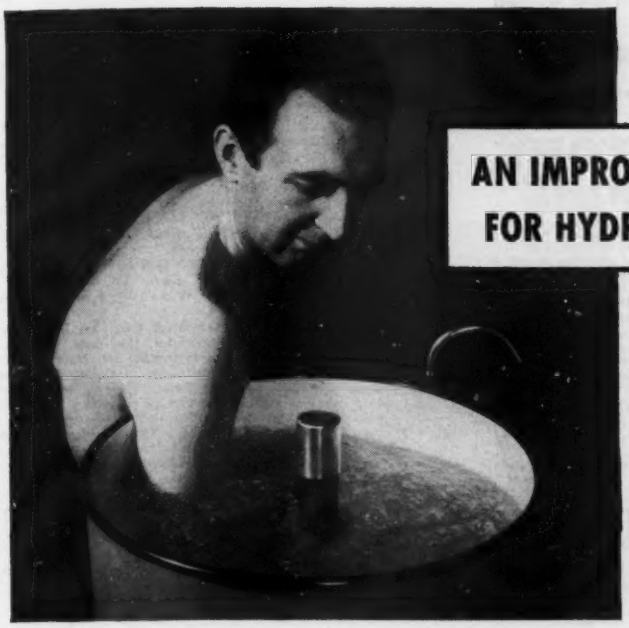

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Continued from page 68

NORTH CAROLINA

Camp Butner Convalescent Hospital, Camp Butner, was released by the Army on January 1, this being one of the twenty-three released on that date out of its wartime peak of sixty-five.

The Tri-State meeting (Carolinas and Virginia), will be held in Richmond, Virginia, February 25-26.

Sixth District Medical Society has elected Dr. R. Bruce Wilkins, Durham, President; Dr. Joseph Thompson, Creedmoor, Vice-President; and Dr. P. G. Green, Burlington, Secretary-Treasurer.

Wilson County Medical Society has recommended that a county-town hospital be established and has appointed the following project committee: Dr. C. A. Woodard, Chairman; Dr. E. L. Strickland, Dr. Badie T. Clark, Dr. R. L. Fike, Dr. C. E. Simons, and Dr. G. W. Mitchell.

Camp Davis Hospital of 2000 beds will be reopened as a unit of the medical department of Camp LeJeune and will be used for personnel of the marine corps, navy and Royal Netherlands marines.

Dr. Donald S. Carter, New York City, has been appointed as practicing clinical psychologist for the state hospitals as announced by the general superintendent, Dr. David A. Young.

Dr. William L. Venning, Instructor in Pediatrics, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, has resigned to enter private practice of pediatrics in Charlotte.

Dr. Robert B. Lawson has returned to his position as Assistant Professor of Pediatrics, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, after a year's leave of absence on fellowship with the National Foundation for Infantile Paralysis working in the laboratories of the William Hooper Foundation at the University of California.

Dr. M. B. Bethel, Concord, succeeds Dr. George Hays as City Health Officer.

Dr. Frank L. Wilson, Salisbury, has been appointed Director of Cabarrus County Health Department.

Dr. W. K. McDowell, Tarboro, has resigned as Health Officer for Halifax County.

Continued on page 72

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Continued from page 70

Dr. W. E. Woodruff, Winston-Salem, has been added to the surgical staff of Randolph Hospital, Asheboro.

North Carolina physicians who have been released from military service and returned to practice are: Dr. Charles Bunch, Charlotte; Dr. Paul C. Bratten, Winston-Salem; Dr. Samuel S. Cooley, Black Mountain; Dr. Horton Camp, Pittsboro; Dr. Oscar W. Cranz, Kinston; Dr. Frank Edmondson, Tarboro; Dr. William D. Farmer, Greensboro; Dr. B. A. Helsabeck, Winston-Salem; Dr. Frank M. Killian, Franklin; Dr. Maurice LeBauer, Greensboro; Dr. James F. Marshall, Winston-Salem; Dr. J. H. McNeill, North Wilkesboro; Dr. Robert T. Odom, Winston-Salem; Dr. C. A. Peabody, Winston-Salem; Dr. Gordon Smith, Rocky Mount; Dr. J. B. Stevens, Greensboro; and Dr. Ernest Harold Williams, Rocky Mount.

Dr. James Watson, Major, Medical Corps, formerly Director of Mental Hygiene of the North Carolina State Board of Charities and Public Welfare, is Chief Neuropsychiatrist of the Veterans Administration Mental Hygiene Clinic, Cleveland, Ohio.

Dr. William Townsend Davison, Durham, and Miss Mildred McCarthy, Fairhaven, Massachusetts, were married recently.

Dr. David L. Pressly, Statesville, and Miss Anita Arneson, San Antonio, Texas, were married recently.

Dr. Robert James Ruark, Raleigh, and Mrs. Cleste Edgerton Guess, Chapel Hill, were married recently.

Dr. Sylvester D. Craig, Winston-Salem, President of the North Carolina State Board of Health, has been named to direct the surplus properties program of the North Carolina State Board of Health, acting as liaison officer in the handling of matters affecting surplus government property that can be used by hospitals and public health agencies in North Carolina.

Dr. Robert F. Miller has opened offices in the Professional Building, Charlotte, in association with Dr. Thomas D. Sparrow for the practice of surgery.

Dr. Howard T. Holden is associated with Drs. Hovis and Foster, Charlotte, in the practice of otolaryngology.

The Nalle Clinic, Charlotte, has reopened its Department of Urology under the direction of Dr. Preston Nowlin.

Dr. William O. Johnston has reopened his office at Charlotte for the practice of internal medicine.

Dr. Horace Hayden Hodgens, Kinston, and Miss Elizabeth Louise Rowe were married recently.

Dr. Henry P. Royster, Raleigh, and Miss Ethel R. Fisher, Reedville, Pennsylvania, were married recently.

Deaths

Dr. Clarence M. Cheadle, Burnsville, aged 76, died recently of heart disease.

Dr. Lewis Michael Fox, Asheboro, aged 86, died recently of pneumonia.

Dr. Mercer C. Parrott, Kinston, aged 51, died recently of a heart attack.

OKLAHOMA

Glennan General Hospital, Okmulgee, has been released by the Army and will be offered to the Veterans Administration or to the former owners.

Dr. Wann Langston for more than thirty years Professor and Chairman, Department of Medicine, Oklahoma School of Medicine, Oklahoma City, has been appointed Acting Dean of the School, filling the vacancy that occurred with the death of Dr. Tom Lowry.

Deaths

Dr. James Cicero Bramblett, Chickasha, aged 67, died recently of cerebral hemorrhage.

Dr. Tom Lowry, Oklahoma City, aged 54, died December 11, 1945.

SOUTH CAROLINA

Coastal Medical Society has elected Dr. J. W. Carroll, Russellville, President; Dr. J. W. Chapman, Walterboro, Vice-President; and Dr. A. R. Johnston, St. George, Secretary-Treasurer.

Stark General Hospital, Charleston, was released January 1 by the Army and will be offered to the Veterans Administration or to the former owners.

South Carolina physicians who have recently been released from military service and returned to practice are: Dr. Lawrence P. Thackston, Orangeburg; Dr. Lane E. Mays, Seneca; Dr. John F. Rainey, Anderson; Dr. Robert Stith, Florence; and Dr. Prentiss M. Kinney, Bennettsville.

Continued on page 74

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Continued from page 72

Dr. Cecil Jennings Hawes, Conway, and Miss Ann Jackson Brattan, Woodbury, were married recently.

Dr. Robert Calvin Brownlee Jr., Due West, and Miss Jewel Pharr, Charlotte, North Carolina, were married recently.

General Hospital staff, Greenville, is composed of Dr. Asa M. Scarborough, President; Dr. J. E. Lipscomb Jr., Vice-President; and Dr. Joseph I. Converse, Secretary. Dr. Keitt Smith and Dr. R. A. Blakey were elected members of the Medical Committee.

St. Francis Hospital, Greenville, has elected as officers of staff: Dr. West Simmons, President; Dr. C. F. Corn, Vice-President; and Dr. Chas. Mims, Secretary.

Deaths

Dr. David Bunyan Jackson, Greer, aged 87, died recently.

Dr. Robert H. Aricil, Laurens, aged 40, died recently.

Dr. Francis LeJau Parker, Charleston, aged 69, died recently of coronary disease.

Dr. Joseph Barnett Workman, Ware Shoals, aged 67, died recently of injuries received in an automobile accident.

TENNESSEE

Tennessee State Medical Association will hold its 111th annual meeting at Knoxville, Andrew Johnson Hotel, April 9-11.

Dr. Harrison H. Shoulders, Nashville, was named President-Elect of the American Medical Association at the House of Delegates meeting held in December, 1945.

Dr. Kate Savage Zerfoss, Nashville, presided at the mid-year Board meeting of the American Medical Women's Association held at New Orleans, Louisiana, recently.

Camp Forrest Hospital Center (POW), Camp Forrest, and Thayer General Hospital, Nashville, have been released by the Army and will be offered to the Veterans Administration or to the former owners.

University of Tennessee, Knoxville, has received a grant made by Sharp and Dohme, Incorporated, Philadelphia, Pennsylvania, to the Department of Bacteriology, for a study of sulfonamide drugs in the control of fowl typhoid infection. The investigation will be conducted by Dr. Darlington F. Holtman, Ph.D., Professor of Bacteriology and head of the Department.

Dr. Thomas D. Moore, Memphis, has been appointed Professor and head of the Department of Urology, University of Tennessee College of Medicine, Memphis, Dr. George R. Livermore having asked to be relieved of his responsibilities as head of the Department. Dr. Livermore will continue as a professor after a temporary leave of absence.

Dr. Walter J. Johnson, Pulaski, has been appointed a member of the Tennessee Board of Medical Examiners, succeeding the late Dr. James H. Keeling.

Dr. Marion G. Fisher, Jonesboro, has resigned as Director, Washington County-Johnson City Health Department, to accept a similar position with the Lorraine County (Ohio) Health Department, with headquarters in Oberlin, Ohio.

Dr. George K. Carpenter, Nashville, has returned to the practice of orthopedic surgery.

Dr. Selmar Burchart and Miss Katherine Hawks, both of Memphis, were married recently.

Deaths

Dr. William Celsor, Hartsville, aged 85, died recently.

Dr. Newton Murray Tucker, Nashville, aged 74, died recently of heart disease.

TEXAS

Fourth District Medical Society has elected Dr. H. L. Locker, Brownwood, President; Dr. O. H. Chandler, Ballinger, Vice-President; and Dr. Glenn H. Ricks, Brady, Secretary.

Continued on page 76

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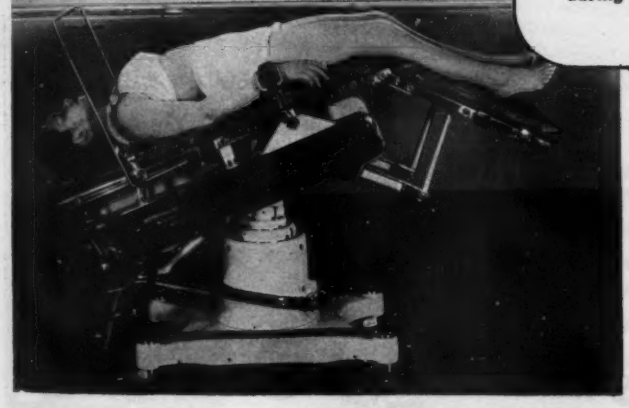

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Continued from page 74

Thirteenth District Medical Society has elected Dr. A. L. Roberts, Fort Worth, President; Dr. Frank C. Hodges, Abilene, Vice-President; and Dr. Joe R. Wise, Fort Worth, Secretary-Treasurer, re-elected.

Charters have been granted for hospitals at Leonard, Dimmit, Wolfe City and Crosbyton under the cooperative hospital act. The Wolfe City Hospital is being sponsored by the Wolfe City Luncheon Club with Dr. T. M. McDonald, Chairman, Dr. Paul M. Fulks, Dr. J. C. Cheatham, and Dr. S. B. Cooper on the Board of Directors.

Ashburn General Hospital, McKinney, and Harmon General Hospital, Longview, have been released by the Army and will be offered to the Veterans Administration or to the former owners.

Dr. P. I. Nixon has been made Chairman of the San Antonio Health Board.

Texas Eclectic Medical Association has elected Dr. C. W. Williams, Abilene, President.

Hermann Hospital, Houston, will receive an income from Houston real estate valued at more than $200,000 under a bequest by the late Dr. Oscar L. Norsworthy, first Chief of Staff at the hospital, the fund to be used for pathologic research.

Texas physicians who have recently been released from military service and returned to practice are: Dr. Raphael Conte, Dr. Arthur M. Faris, Dr. Frederick G. Eidman, Dr. Carl C. Carrico, Dr. J. Aubrey Cockrell, and Dr. H. Julian Frachtman, all of Houston; Dr. R. L. Dailey, Wichita Falls, Dr. T. A. Searcy, Hearne, Dr. Mason R. Lyons, Borger, Dr. Frank C. Hodges, Abilene; Dr. R. H. Bell, Palestine; Dr. Masters H. Moore, Tyler; Dr. E. C. Williams and Dr. Lewie Morgan, both of Bonham; Dr. A. J. Magliolo, Galveston; Dr. R. N. Smith Jr., Falfurrias; Dr. Robert F. Short, Dallas; Dr. John D. Dupre, Levelland; Dr. D. E. Packard, Kerrville; Dr. H. E. Lancaster, Beeville; Dr. George Lacy, Fort Worth; Dr. O. A. Manske, Waco; Dr. Hubert Seale, Abilene; Dr. M. Cohen, Denison; Dr. W. S. Rhode, Colorado City; Dr. Cooper Conner, Fort Worth; Dr. M. Zenos Smith, Wichita Falls; Dr. Landon R. McIntire, Big Spring; Dr. Howard Y. Sigler, Hereford; and Dr. Herbert Hill, San Antonio.

Dr. Jesse L. Coleman has been appointed to the staff of the Kerrville State Sanatorium, Kerrville.

Dr. Henry Schwartze, Kerrville, has been appointed by the State Board of Control as Superintendent of the Kerrville State Sanatorium for Negroes, succeeding Dr. David McCullough, who resigned to enter private practice.

Dr. Terrell Speed, Temple, has been made a diplomate of the American Board of Surgery.

Dr. E. S. Freeman, Abilene, has been transferred to the directorship of the Jasper-Newton County Health Unit from a similar position at Abilene, Taylor County.

Hillcrest Hospital, Waco, has elected to its staff Dr. Howard Dudgeon, President, Dr. Ernest Johnson, Vice-President, and re-elected Dr. Paul Power, Secretary.

Dr. and Mrs. J. G. Dodge, Abilene, recently celebrated their golden wedding anniversary.

Dr. Minnie L. Maffett, Dallas, who as President of the National Federation of Business and Professional Women's Clubs organzied financial aid for nursing schools in China, has been awarded a certificate of membership in the China Relief Legion in New York. The Federation has contributed $60,000 to the project. Dr. Maffett has also been honored by the Dallas Business and Professional Women's Club voting to establish a scholarship in science for a woman in one of the medical schools of Texas, to be known as the Dr. Minnie L. Maffett Scholarship.

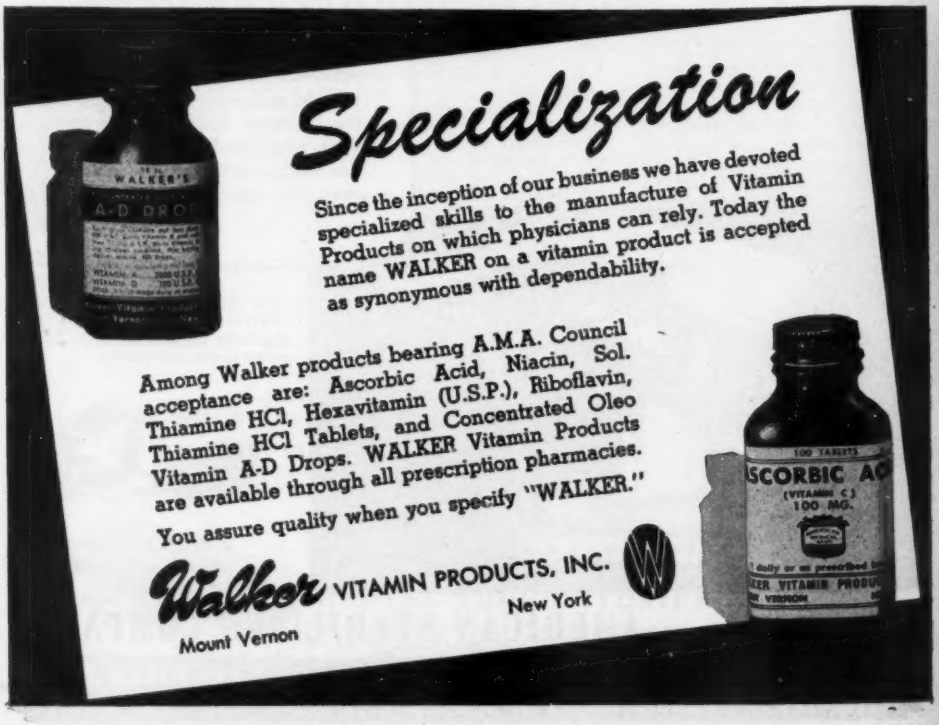
Dr. Bert C. Ball, Fort Worth, has been elected First Vice-President of the Fort Worth-Tarrant County Tuberculosis Society.

Dr. Branch Craige Jr., El Paso, and Miss Jean McCracken, Joliet, Illinois, were married recently.

Dr. Preston Calvin Stringfield Jr., Dallas, and Miss Bille Waugh Johnson, North Wilkesboro, North Carolina, were married recently.

Dr. Theodore S. Howell, Houston, and Miss Mildred Hendrix were married recently.

Continued on page 78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The Vitamin Food Company's genuine, grain grown Dried Brewers Yeasts fully supply vitamin B's natural, and whole, independent growth and lactation promoting anti beri beri, anti pellegra, and appetite promoting factors.

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SEPT.	10	61.5	53.0	Litter		SEPT.	10	66.0	57.5	Litter
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A Spencer antepartum support designed especially for this woman. Equally effective for postpartum period.

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Light, flexible, easily adjusted to increasing development.

Note, also, the Spencer antepartum - postpartum breast support designed especially for her.

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For Abdomen, Back and Breasts

Continued from page 76

DEATHS

Dr. Pat Biscoe, Houston, aged 50, died recently.

Dr. Frank Branch Gooch, Houston, aged 57, died recently of coronary occlusion.

Dr. John Henry Erwin, Bandera, aged 69, died recently following a cerebral hemorrhage.

Dr. Buford A. Russell, Sherman, aged 58, died recently.

Dr. Samuel Albert Miller, Longview, aged 78, died recently of hypertension and nephritis.

Dr. I. J. Morris, Dallas, aged 63, died recently.

Dr. Rogers William McKean, Fort Worth, aged 57, died recently of cirrhosis of the liver.

Dr. John Adams Stanfield, Fort Worth, aged 51, died recently.

Dr. James Joshua Terrill, Dallas, aged 68, died recently of tuberculosis complicated by myocardial failure.

Dr. William Preston White, Henderson, aged 81, died recently of heart disease.

VIRGINIA

Tri-State meeting (Carolinas and Virginia) will be held in Richmond, February 25-26.

Dr. John G. McNiel has been assigned Health Officer of Southside Health District, with headquarters at Farmville.

Dr. W. W. Griggs has been appointed Health Officer of Page-Warren-Shenandoah Health District, with headquarters at Luray.

Dr. Wm. T. Pugh, Lynchburg, has been made Chief of Surgical Service, McGuire General Hospital, Richmond. Dr. Pugh practiced surgery in Lynchburg for ten years before entering military service.

Dr. G. C. Godwin, Front Royal, has been appointed Director of Tuberculosis Control for the City of Richmond.

Continued on page 80

Classified Advertisements

OBSTETRICIAN, age 37, and married, just returning from military service, desires to practice obstetrics, preferably having an association with opportunity to be associated with a medical school or teaching hospital. Member of American Board of Obstetrics and Gynecology and some experience in teaching. Write DI, care Southern Medical Journal.

PATHOLOGIST, age 40, Board Diplomate, competent and experienced in pathologic anatomy and clinical pathology; consultant, professor and executive; laboratory director and research associate in distinguished organization; numerous publications; excellent references. Request details first letter. Write PGJ, care Southern Medical Journal.

WANTED—Health Officer for small Southern city located in the Textile Center. Training or experience essential. Good location, good schools and fine climate. Salary open. Address BOC, care Southern Medical Journal.

FOR SALE—Half interest in registered 25-bed medical and physiotherapeutic hospital, Atlanta, Georgia, to younger resident internist and laboratory man. Price one-half of operating profit in 1945. Balance purchasable in five or ten years same price. Owner in uncertain health. B.W.W., care Southern Medical Journal.

FOR SALE—Complete outfit of eye, ear, nose and throat equipment consisting of most all essential instruments for treating, diagnostic and operating purposes: Refracting case with frame; bi-film transilluminator; Bi-polar; almost new electric sterilizer; General Electric coagulating, fulgurating and dessicating instrument on roller stand, all cords and electrodes. All in good condition. Cheap if all or most all purchased by an individual. Retired. Write DLT, care Southern Medical Journal.

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for "Physiologic" Correction of Habitual and Atonic Constipation

Though effective whenever constipation must be corrected, Cholmodin proves especially useful in the aged and in bedridden patients, in whom impaired fat-digestion, intolerance to fatty foods, and diminished absorption of fat-soluble vitamins is so often encountered.

Available through all pharmacies in boxes of 50 tablets.

Composed of deoxycholic acid (1½ gr.) and extract of aloes (¾ gr.), Cholmodin activates the entire intestinal tube, intensifies bile flow, improves the digestion and absorption of fats. Deoxycholic acid, a constituent of human bile and a true choleretic, augments peristalsis in the small bowel. Under its influence, the extract of aloes begins to release the contained emodin promptly at a gradual rate, thus activating the lower bowel gently, without griping and without excessive water loss. The evacuation induced by Cholmodin duplicates closely the normal effect of intestinal motility.

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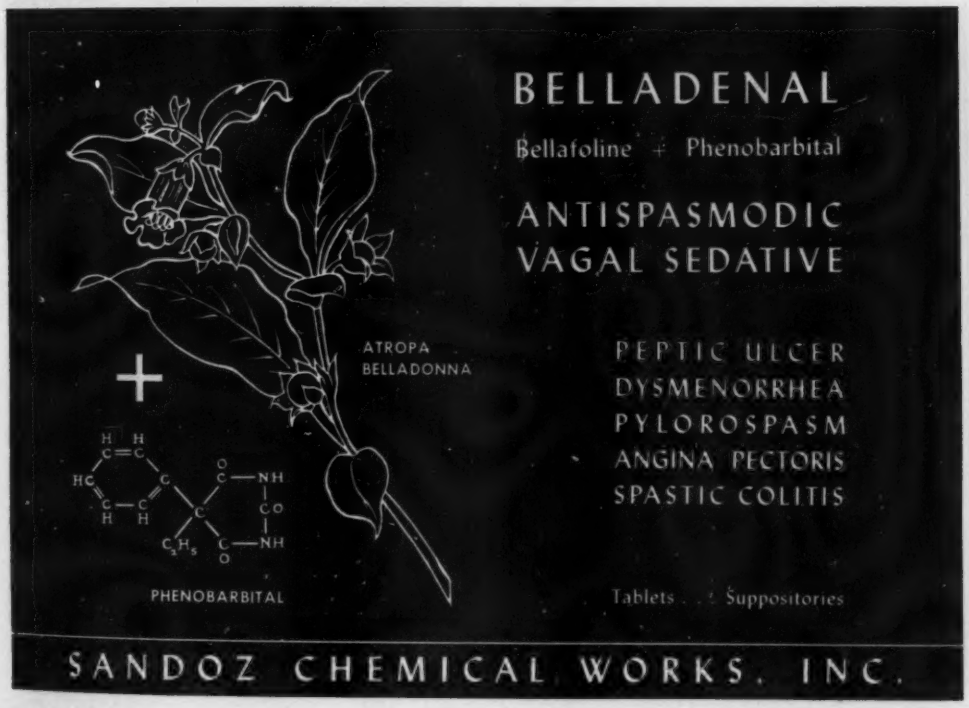

Continued from page 78

Dr. John Robert Massie Jr. is now connected with McGuire Clinic, surgical staff, Richmond.

Dr. Charles E. Troland is associated with Dr. Claude C. Coleman and Dr. John M. Meredith, Richmond, for the practice of neurological surgery.

Dr. George Washington Fishburn and Miss Nellie Mae Embree McIlwaine, both of Richmond, were married recently.

Virginia physicians who have recently been released from military service and returned to practice are: Dr. Julian B. Doss, formerly of Pen Hook, now of South Boston; Dr. Luther B. Lowe, Pearisburg; and Dr. T. Addison Morgan, Franklin.

DEATHS

Dr. Hugh Tucker Chelf Jr., Culpeper, aged 37, died recently of coronary occlusion.

Dr. James Louis Early, Radford, aged 68, died recently.

Dr. William Kenneth McCoy, Gum Spring, aged 72, died recently.

Dr. Francis Whittle Upshur, Richmond, aged 70, died recently.

WEST VIRGINIA

West Virginia physicians who have recently been released from military service and returned to practice are: Dr. N. D. Priddy, Ravenswood; Dr. W. L. Haltom, and Dr. Marvin H. Porterfield, Martinsburg; Dr. Fred E. Brammer, Dehue; Dr. Justus C. Pickett, Morgantown; Dr. Charles E. Staats, and Dr. Ralph J. Jones, Charleston.

Dr. Joseph Martin Ford, Huntington, and Miss Eliot James, New York City, were married recently.

DEATHS

Dr. Joseph McArthur Spinks, Oak Hill, aged 58, died recently of epidermoid carcinoma of the esophagus.

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MORE NORMAL CHILDHOOD

Natural and healthy childhood exuberance may be limited by anal pathology not demonstrable by anal stricture but nevertheless incapacitating and conducive to lethargy, nervousness and insomnia. Muscle tone greater than normal, especially in association with an atonic colon, is often reduced by mechanical dilation with Young's Dilators.

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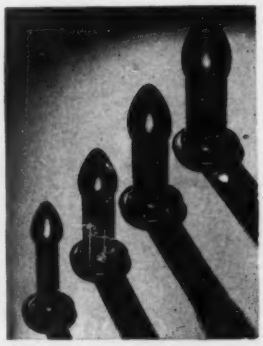
Young's Dilators in Children's small and intermediate sizes, sold on prescription only, are available in bakelite; boilable and easily inserted by parent or nurse. Postoperative use of Young's Dilators after pediatric anal surgery to relieve stenosis and atresia of the anus and rectum are also recommended by pediatricians and proctologists. Children's set of 4 sizes, $4.50. Adult set of 4 sizes also available, $4.75. Available at ethical drug stores or your surgical supply house. Literature on request.



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in ACUTE OTITIS MEDIA

SYMPTOMS: Pain, Fever, edema, leucocytosis, sense of fullness and impaired hearing. **TREATMENT:** Relief of pain and inflammation—Auralgan. **ACTION:** Decongestant, analgesic, bacteriostatic.

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SYMPTOMS: Persistent discharge, often foul smelling, usually no toxemia, no pain, no fever. **TREATMENT:** Otosmosan. **FORMULA:** Sulfathiazole 10%—Urea 10%—Benzocaine 1%—In Glycerol (Doho). **ACTION:** Deodorizes the discharge, liquifies unhealthy granulations, bacteriostatic, permits normal epithelialization.

Complimentary quantities for clinical trial

Scientific data and reprints of clinical studies reporting upon the use of Otosmosan available on request.

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OPHTHALMIC AND NASAL

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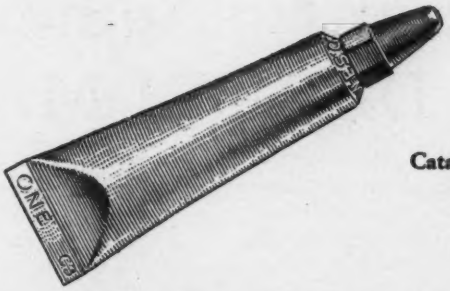

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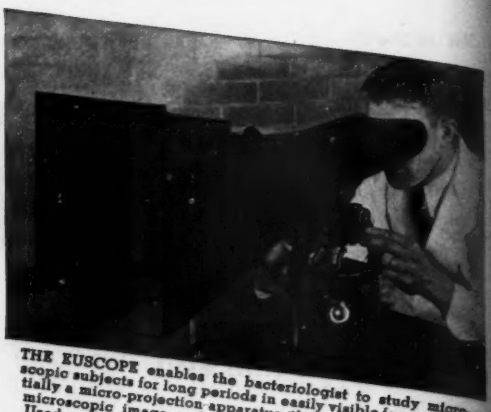
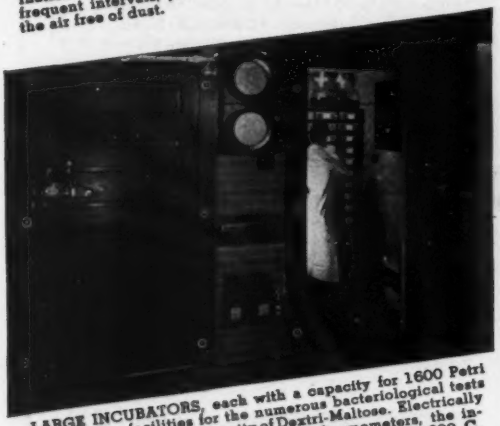
STEAM-WASHED PLATING ROOM where bacteriological analyses are made with every precaution to prevent contamination. All air taken into this glassed-in room is filtered. At frequent intervals, jets of live steam are employed to wash the air free of dust.



THE EUSCOPE enables the bacteriologist to study microscopic subjects for long periods in easily visible form. Essentially a micro-projection apparatus, the euscope enlarges the microscopic image and thus makes for greater accuracy. Used with a screen it enables the operator to demonstrate specimens to a group.



LARGE INCUBATORS, each with a capacity for 1600 Petri dishes, offer facilities for the numerous bacteriological tests made daily to assure the purity of Dextri-Maltose. Electrically heated and equipped with recording thermometers, the incubators can be varied from room temperature to 60° C. Uniform temperature is maintained within ± 1 degree.

BOTTLE-FILLER developed in and reported from the Mead Johnson Laboratory to expedite bacteriological procedures and so to give time for more tests. Filling the bottles with distilled water, a stage in testing samples, formerly required several hours but is now reduced to a fraction of that time.

Modern Equipment for Testing DEXTRI-MALTOSE

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OF BILE FLOW

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Active stimulation of bile secretion, as well as direct substitution of whole bile, is provided with DESICOL Kapseals. DESICOL, containing desiccated fresh whole mammalian bile, represents all factors of original bile. It contains no added laxatives or synthetic bile salts.

Two Kapseals are approximately equivalent to 5 cc. fresh whole gallbladder bile, or 50 to 75 cc. liver bile. The average dose is two or three DESICOL Kapseals three times daily at meal-times.

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